

Redevelopment of the Riverfront of Rosario

Civil Engineering Consultancy Project

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R. F. den Brave
T. J. B. van Doormaal
T. Kuster
D. E. Termote
C. E. Veen
D. Westerink

Delft University of Technology



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Supervisors:	Prof. dr. ir. P. W. Chan, Dr. Ir. E. J. Houwing, Dr. Ir. C. Mai Van, Ir. P. Arecco,	TU Delft TU Delft TU Delft Port Consultants Rotterdam

Preface

Before you lies the report of the civil engineering consultancy project that we conducted in Rosario for the past eight weeks. It has been written to create a redevelopment plan for the riverfront of Rosario. This project was undertaken by request of Ente Administrador Puerto Rosario (ENAPRO) and Port Consultants Rotterdam and is part of our Master study programs of Civil Engineering at the Delft University of Technology.

We would like to thank our supervisors Erik-Jan Houwing, Paul Chan and Cong Mai Van for their guidance and support during the project. Special thanks go to Pablo Arecco, Matias Palma and Julia Ortega for helping us with all our questions and any other information we needed. Without their cooperation this research would not have been a success.

We hope that you enjoy reading the report.

*R. F. den Brave
T. J. B. van Doormaal
T. Kuster
D. E. Termote
C. E. Veen
D. Westerink
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Summary

This study aims to create a redevelopment plan for the riverfront of Rosario by proposing a new spatial plan. This redevelopment plan is based on four themes that fall in line with the vision of the municipality in order for the riverfront to reach its full potential. These four themes are accessibility, safety, innovation and sustainability which form the basis for the six initiatives. Aiming for an enhancement of port-city integration and possibly solve some of the technical and social problems the city is facing. To reduce the scale of this research, a smaller scope has been selected which starts from Parque España till Parque de la Arenera. Within this area an attempt will be made to investigate what initiatives are feasible and what value they add. It is proposed to carry out water hubs, the reuse of stranded boats and port elements, a port museum, tourist information boards, water taxis or -buses and the restoration of the riverbanks to also enhance the port-city integration whereof there is a lack of at the moment. To strengthen the initiatives technical feasibility is also performed to the project. It is recommended to further analyse the proposed solutions for enhancing port-city integration and perform a more detailed technical feasibility.

Keywords: Riverfront redevelopment, Port-city integration, Technical feasibility analysis, Engagement strategy, Spatial plan.

Contents

Preface	i
Summary	ii
List of Figures	v
List of Tables	vii
1 Introduction	1
2 Waterfront Redevelopment	4
2.1 Riverfront redevelopment	4
2.2 Definitions of waterfront development	5
2.3 Sustainable waterfront development	5
2.4 The ten principles for sustainable waterfront development.	5
2.5 Lessons learned from riverfront redevelopments	7
2.5.1 Stakeholder analysis and engagement	7
2.5.2 Organizational structure	7
2.5.3 Drivers for sustainable urban growth	7
3 Current Situation	8
3.1 History.	8
3.2 Current initiatives of riverfront development.	10
3.2.1 Short-term initiatives	10
3.2.2 Mid-term initiatives	11
3.2.3 Long-term initiatives	11
3.3 Riverfront development problems and improvements	11
3.3.1 Missing link between port and city.	11
3.3.2 Problems within the stakeholders framework	12
3.3.3 Structural riverbank problems	13
3.4 SWOT Analysis.	16
4 Redevelopment plan	18
4.1 Vision	18
4.2 Initiatives	20
4.2.1 Reuse stranded boats and port elements	20
4.2.2 Tourist information boards	22
4.2.3 Port Museum	22
4.2.4 Water taxi-bus	24
4.2.5 Water hub.	25
4.2.6 Restoring of the riverbanks	26
4.3 Stakeholder engagement	27
4.4 Time schedule	27
5 Technical Feasibility	29
5.1 Bank.	29
5.1.1 Multi-criteria analysis	29
5.1.2 Rip rap design	33
5.2 Water Hub	35
5.2.1 Structures.	36
5.2.2 Current state structures	36
5.2.3 Capacity of structures	41
5.3 Floating docks	42

6 Stakeholder engagement plan	44
6.1 Stakeholder Analysis	44
6.1.1 Organisational structure	44
6.1.2 Formal relationships of actors involved	46
6.1.3 Decision framework	46
6.1.4 SWOT analysis	51
6.2 Engagement strategy.	52
6.2.1 Lack of resources.	52
6.2.2 Formal and informal education.	52
6.2.3 Internal knowledge on ports and waterways	52
6.2.4 Creating an overarching entity	53
6.2.5 Availability of land	53
6.2.6 Collaboration model	54
7 Conclusions and Recommendations	55
References	61
A Position salience analysis	62
B Map Redevelopment Rosario	67
C Interviews	70
C.1 Municipality - Secretary of Planning and Public Works	70
C.2 Municipality - Undersecretary of Tourism	74
C.3 Bolsa de Commerce - Board of Trade	76
C.4 ENAPRO - Matias Palma	79
C.5 ENAPRO - Guillermo Miguel.	83

List of Figures

3.1	Overview parks Rosario	9
3.2	Overview of the embankment problems	13
3.3	Parque de la Arenera	13
3.4	Riverfront problem 2	14
3.5	Riverfront problem 3 - Parque Las Colectividades	15
3.6	Riverfront problem 4 - Club Mitre	15
3.7	Riverfront Parque a la Bandera side view	16
4.1	New vision map of the Rosarion Riverfront [29]	19
4.4	La Isla de los Inventos [35]	21
4.5	QR codes that can redirect one's smartphone to detailed information about site's along the riverfront[29]	22
4.6	FutureLand at Maasvlakte Rotterdam, the Netherlands [36]	23
4.7	Boat tours through the Port of Rotterdam conducted by FutureLand [36]	23
4.8	Water taxi in New York, United States of America [38]	24
4.9	Potential for water taxi extension across the riverfront of Rosario [38]	25
4.10	Water hub in Puerto Madero in Buenos Aires, Argentina	26
4.11	Time approximation of the proposed redevelopment plan	27
5.1	Narrow part of the Paraná River	30
5.2	Cross section bank Parque de Las Colectividades	34
5.3	Possible riprap design [51]	35
5.4	Render water hub Parque de Las Colectividades	35
5.5	Structure in front of Maui Tower	36
5.6	Dolphins	37
5.7	Close-up supporting pile	37
5.8	Connection dolphins	38
5.9	Structure in front of Parque de Las Colectividades	38
5.10	Concrete dolphins	39
5.11	Foundation piles of squared and rectangular shaped dolphins	39
5.12	Ship loading grain tower	40
5.13	Foundation grain tower	40
5.15	Close view of the collapsed bridge	41
5.14	Bridges between the dolphins	41
6.1	General Overview Government.	45
6.2	Formal chart	47
6.3	Decision Time Line	48
6.4	Salience/position matrix, phase 0	50
6.5	Salience/position matrix, phase 1	50
6.6	SWOT-analysis based on stakeholder interviews	52
6.7	Collaboration model	54
B.1	Function map riverfront Rosario	68
B.2	Proposed plan for the riverfront of Rosario	69
C.1	Decision Timeline Planning and Public Works	73
C.2	Decision Timeline Secretary of Tourism	75
C.3	Decision Timeline Board of Trade	78

C.4 Decision Timeline Matias Palma-ENAPRO	82
C.5 Decision Timeline Guillermo Miguel-ENAPRO	85

List of Tables

5.1	Multi-criteria analysis on river bank protection	32
5.2	Estimated costs per alternative	32
5.3	Cognitive reliability and error analysis method table	33
5.4	Overview calculation pile capacity	42

Introduction

The public port of Rosario is one of the largest ports in Argentina that is responsible for the transport of 1.5 million tons soy and grain [1]. The port of Rosario is used for export and import via the Paraná River. This river is the second longest river that flows through South America as it crosses the countries Brazil, Paraguay and Argentina. Near Uruguay the river flows out into the Rio de la Plata and eventually, it empties into the Atlantic Ocean near Montevideo. It is the thirteenth longest river in the world, with a length of approximately 4880 km [2]. The riverfront of Rosario stretches out over approximately 17 kilometers of the river. Due to this strategically good position near the river it is one of the biggest ports of Argentina, with international shipping lines [3]. The hinterland consists of a large agricultural area and therefore, soy and grain are one of the main products that are shipped via the port of Rosario that is operated by Ente Administrador del Puerto Rosario (ENAPRO) [4].

Currently, the port its significance is not visible in the city of Rosario and the riverfront itself is not maintained. The municipality of Rosario faces multiple issues maintaining docks because of landslides, erosion and sinkholes and along the riverfront old port infrastructure is still in the water. Additionally, civil engineering projects are hardly executed as the ownership of certain zones along the riverfront are varied and stakeholders such as the municipality and port authority of Rosario do not communicate. Furthermore, there are little port related activities in the city of Rosario resulting in the a low level of awareness of the importance of the Port to the citizens of Rosario. Therefore, a redevelopment of the riverfront to increase the integration between the significance of the Port and the city of Rosario is necessary.

The current strategic plan of the municipality of Rosario consists of vision and different strategies that include focus on the following; inter-connectivity, accessibility, sustainability, resilience, integration, multi-cultural, peace and innovation to achieve a city with high quality living conditions [5]. This strategic plan aims to restoring the city's relationship with the Paraná River after the relocation of the port. However, after several years of transforming the riverfront to a more attractive place for residents and visitors, it has not yet reached its full potential. For this reason, this report aims to provide a study on how to redevelop the riverfront of Rosario together with the municipality and ENAPRO in order for the riverfront to reach its full potential. Therefore, a conceptual spatial plan is proposed that involves the collaboration between ENAPRO and the municipality with the objective to create more port-city integration. This plan focuses on making the riverfront a safe and accessible place that connects the city and port in a sustainable and innovative way. The four themes in this vision fall in line and strengthen the strategic plan and vision that the municipality of Rosario currently follows. These four themes will together contribute to enhancing the port-city integration on different levels and so recover the city's relationship with the Paraná river. To fulfill this, the redevelopment plan proposes new initiatives that could possibly increase the accessibility to the river and increase the port awareness among the residents and visitors of Rosario. Due to the size of the riverfront, the scope of the research is limited to a section of the riverfront from Nueva Terminal la Fluvial until the Maui Towers and will include initiatives that are aimed for recreational, mobility and educational purposes only.

First, the history and purpose of riverfront redevelopment is described in Chapter 2. Followed by a short history of the Rosario riverfront in Chapter 3 together with an analysis on the current state of the riverfront and the problems it is facing today. Based on this analysis a new vision and redevelopment plan is proposed in Chapter 4 in order for the riverfront to reach its full potential. This chapter also includes descriptions of the six proposed initiatives; the re-use of old boats and port elements, information tourist boards, port museum, water taxi-busses, water hubs with floating docks and the restoration of riverbanks. In order to realise this plan and initiatives, a technical feasibility is conducted in Chapter 5 to ensure that these initiatives can be implemented at the chosen locations. In this chapter a thorough analysis of the capacity of the current structures and the possible alternatives for the riverbanks are evaluated with a multi-criteria analysis. Since the proposed initiatives are placed on lands owned by different stakeholders, a stakeholder analysis is conducted in Chapter 6 to create an engagement strategy for the implementation of the redevelopment plan. These analyses are all based on literature sources and are validated with stakeholder interviews. The final recommendations and follow-up research is discussed in Chapter 7.

Waterfront Redevelopment

The waterfront is a place where the city and water interact, and is defined as a unique and irreplaceable resource where land, water, air, sun and greenery interface with each other in an urban setting. According to Paneria, Mehta, and Bhatt, these are all characteristics that have a natural attraction to people living or coming to the city.

Currently, there is a global trend of redeveloping waterfronts in urban areas to make waterfronts more attractive for its residents as well as future investors. There has been a lot of research and discussion on the redevelopment of historic port areas and waterfronts in the past years to see how cities can benefit from this socially, economically and environmentally. This chapter summarizes what waterfront development entails and how it can be carried out successfully.

2.1. Riverfront redevelopment

Historically, port and city were intimately connected. Cities were developed along easy access to navigable waters, giving rise to numerous cities on rivers and seas across the world. According to research done by Hein, people redesigned coastlines, creating ports and waterfronts to connect water and land, and created cities which facilitated the necessary facilities such as wharf's or quays, piers or jetties, docks and numerous specialized structures for the transshipment of goods and people between domains. Resulting in the port and city being interrelated.

However, with the industrialization the two grew apart, creating two separate spatial entities; working port and post-industrial waterfront. Hein also describes that the industrialization in the 19th and 20th centuries led to the creation of mono-functional areas which indicates that it was bringing in bigger and more specialized ships. Sailing ships were replaced with larger steamships and the multi-functional transporters were superseded by container ships and oil tankers. In turn, transforming the ports and the cities in which they were located. New technologies and means of transshipment pushed cities and shippers into recurrent reconstruction of port facilities. Bigger cranes and warehouses were needed as well as renewed railway lines next to the shipping facilities. By the 1960s, across the globe new ports were developed in the outskirts of cities to accommodate large container ships, also known as containerization. Containerization led to wholesale restructuring of shipping networks, trade patterns, port facilities, port city hierarchies, and urban form [7]. Consequently, leading to the abandonment of previous inner-city ports and the increase of derelict areas along the waterfront, and the separation of port and city.

Since the 1980s, the revitalisation of old port waterfront areas has become one of the most interesting phenomena of urban renewal providing cities with physical re-composition, functional regeneration, re-use of derelict areas, and new attraction for private investments [7]. Especially with the increasing environmental awareness, and the increasing urbanization and industrialization causing a decrease in areas for recreation and open spaces in cities, waterfront revitalisation of great importance [6]. City governments used the opportunity to redevelop the former inner-city ports, taking advantage of water

access and historical buildings for the renovation and branding of their cities. They aimed to reconnect people to water and to enhance local port identities by renovating facilities originally destined for port industries to facilities for leisure and tourist venues, and creating public parks along the waterfront for recreation. When revitalized, derelict waterfronts have the potential to provide access to new recreation opportunities, public enjoyment and economic development, as well as creating awareness of its historic port identity. Consequently, attracting new high standard investments of which cities will benefit socially, economically and environmentally.

2.2. Definitions of waterfront development

There are several meanings of waterfront development that vary depending on sites and cities, such as waterfront regeneration, revitalization, rehabilitation, and waterfront redevelopment [8]. The same goes for the waterfront. According to the Cambridge Dictionary, waterfront means: “a part of a town that is next to an area of water such as a lake, a river or an ocean.” [9]. However, it has many other definitions in the urban context, it may also be described as:

- Any property has a strong visual or physical connection to the water [10].
- The conflux area of water and land [11].
- Hybrid locations of ecological, economic, and social zones of transition and dispersal, spatially reified between land and water [12].

Waterfront also has different words as well; city port, harbor-front, riverside, river edge, water edge, and riverfront [8]. Throughout this paper, the definition of riverfront development is used when analysing Rosario, as the city is located alongside the Paraná River.

2.3. Sustainable waterfront development

Also, the concepts of sustainability can be applied in waterfront redevelopment. Especially at this moment in time with the increasing environmental awareness, sustainability is one of the most important strategic urban development goals that should be integrated into citywide development planning [8]. Sustainable development is the process that meets the needs of the present without compromising the ability of future generations to meet their own needs [13]. Consequently, ensuring sustainability is very important as a strategic goal in waterfront development projects in the pursuit of improving the quality of life of residents of urban areas by balancing environmental, societal and economic considerations. By reusing old historic port facilities along the waterfront for accommodating new functions and activities as well as promoting sustainable production and consumption of energy, good government and research and education on sustainability on location.

2.4. The ten principles for sustainable waterfront development

During the Global Conference on the Urban Future (URBAN 21) held in Berlin in July 2000 and in the course of the EXPO 2000 World Exhibition, 10 Principles for a Sustainable Development of Urban Waterfront Areas were approved. These ten principles were developed by Wasserstadt GmbH, Berlin, in collaboration with the Center Cities on Water, Venice, in the course of international seminars attended by local administrators, public and private entrepreneurs, university professors and scholars of the processes to re-qualify urban waterfronts. The 10 Principles for a Sustainable Development of Urban Waterfront highlight the strongest elements in this process of waterfront transformation and provide a general framework for the management and planning of the urban waterfront, for the safeguarding of the territory and for the development of environmental and cultural resources. The principles are described below.

1. Secure the quality of water and the environment

The quality of water in the system of streams, rivers, canals, lakes, bays and the sea is a prerequisite for all waterfront developments. The municipalities are responsible for the sustainable recovery of derelict banks and contaminated water.

2. Waterfronts are part of the existing urban fabric
New waterfronts should be conceived as an integral part of the existing city and contribute to its vitality. Water is a part of the urban landscape and should be utilized for specific functions such as waterborne transport, entertainment and culture.
3. The historic identity gives character
Collective heritage of water and city, of events, landmarks and nature should be utilized to give the waterfront redevelopment character and meaning. The preservation of the industrial past is an integral element of sustainable redevelopment.
4. Mixed use is a priority
Waterfronts should celebrate water by offering a diversity of cultural, commercial and housing uses. Those that require access to water should have priority. Housing neighborhoods should be mixed both functionally and socially.
5. Public access is a prerequisite
Waterfronts should be both physically and visually accessible for locals and tourists of all ages and income. Public spaces should be constructed in high quality to allow intensive use.
6. Planning in public private partnerships speeds the process
New waterfront developments should be planned in public private partnerships. Public authorities must guarantee the quality of the design, supply infrastructure and generate social equilibrium. Private developers should be involved from the start to insure knowledge of the markets and to speed the development.
7. Public participation is an element of sustainability
Cities should benefit from sustainable waterfront development not only in ecological and economical terms but also socially. The community should be informed and involved in discussions continuously from the start.
8. Waterfronts are long term projects
Waterfronts need to be redeveloped step by step so the entire city can benefit from their potential. They are a challenge for more than one generation and need a variety of characters both in architecture, public space and art. Public administration must give impulses on a political level to ensure that the objectives are realised independently of economic cycles or short-term interests.
9. Revitalization is an ongoing process
All master planning must be based on the detailed analysis of the principle functions and meanings the waterfront is concerned with. Plans should be flexible, adapt to change and incorporate all relevant disciplines. To encourage a system of sustainable growth, the management and operation of waterfronts during the day and at night must have equal priority to building them.
10. Waterfronts profit from international networking
The re-development of waterfronts is a highly complex task that involves professionals of many disciplines. The exchange of knowledge in an international network between contacts involved in waterfronts on different levels offers both individual support and information about the most important projects completed or underway.

Recently, the 10 Principles have been revised and adapted by several institutions at international level and they are still a valid reference for waterfront redevelopment across the world [14].

2.5. Lessons learned from riverfront redevelopments

Next to the 10 Principles for a Sustainable Development of Urban Waterfront Areas, there are lessons learned that should be taken into account while redeveloping a riverfront. These lessons are gathered based upon riverfront redevelopment projects from developed western countries, such as The Netherlands and Belgium [15], and from the BRICS-countries [16]. Based on this literature, three main topics can be found: (1) stakeholder analysis and engagement, (2) organizational structure and (3) drivers for sustainable urban growth.

2.5.1. Stakeholder analysis and engagement

Because a redevelopment has a complex nature, many disciplines (and therefore also actors) should be involved to exchange information and knowledge. Therefore, a stakeholders analysis should be broad to eliminate the risk of excluding actors. Amongst others, architecture, public space and art, etc [14].

Also the continuous engagement of those stakeholders are of great importance throughout such complex projects. Sustaining a long term redevelopment project requires a strong and dynamic vision. Resulting in engagement and maintaining this engagement of the stakeholders (political authorities and representatives, private investors, and local communities). Actors can be engaged by including cultural heritage into the redevelopment. For example by reusing elements of the port (old port buildings, etc.). The value generated by the project should be obtained in ecological, economical and social terms. Community should be informed and involved in discussions continuously from the start. Commitments are strengthened when projects are based on common interests and shared values of place [14, 16].

Water should have functions such as: waterborne transport, entertainment and culture. If there is a link with the historic nature of the port and waterfront, there is more willingness to re-use and invest in the re-use of the structures [14, 15]. To ensure continuous input and involvement of the stakeholders during the transition from design to implementation the project team must create an open and inclusive process. A specially assigned team can facilitate the process of informing and keeping the stakeholders engaged [15].

2.5.2. Organizational structure

Because riverfront redevelopment is a long incremental process with dynamics in political leadership and bureaucratic institutions that will most likely occur, there should be an overarching (political) entity that ensures that the objectives are realised independently of economic cycles and term interests [14, 16, 15, 17].

Redevelopments projects that are subjected to resource constraints may use Public-Private Partnerships and/or creative and inclusive local management strategies. Feasibility studies for the private organizations can be used to validate the business case. When public and private parties work together in a partnership, they will take on different roles in the project. Local governments will be responsible for the role of initiator, design controller, provide sufficient infrastructure and a balanced social structure. Private parties must provide state of the art market knowledge and facilitate development [14, 16].

2.5.3. Drivers for sustainable urban growth

Riverfront redevelopment can improve the cities appearance, boost the economy and attract people. Therefore, the spatial plan should be diverse (cultural, commercial and housing). What value means for the project is determined by the needs of the actors involved. For port-city integration this can be the re-use of historic port facilities and sustainable problems of the area. Policy tools can help to generate solutions. A thorough analysis of the functions in the project area should be made to develop the master plan. However, individual plans should be integral and dynamic, i.e. low level of detail, to facilitate changes in urban and social needs. The individual plans will concern different scales of riverfront redevelopment and therefore solutions will be generated on the short, medium and long term. Enhancing the willingness of actors in the project [14, 16].

Current Situation

In recent years, the municipality together with other parties has redeveloped the riverfront of Rosario into a public park after it had been inaccessible to the public for many years due to its port functions. However, there are still many problems to be seen along the riverfront, in terms of organization, spatial design and structural safety. For this reason, in the previous chapter, a redevelopment plan was drawn up with five main initiatives. The problems out of which the initiative arose are described in this chapter after the history of the riverfront redevelopment is described with the municipality's vision of Rosario. Additionally, a SWOT-analysis is carried out to show all the riverfront strengths, weaknesses, threats and opportunities of the riverfront at this moment in time.

3.1. History

Rosario has a very long history in port activities and is still to this moment one of the most important ports in Argentina due to its location along the Paraná River. The Paraná River (or Río Paraná) is one of the largest rivers that flows through South America. It crosses the countries Brazil, Paraguay and Argentina. Near Uruguay the river flows out into the Rio de la Plata and eventually, it empties into the Atlantic Ocean near Montevideo. It is the 13th longest river in the world, with a length of approximately 4880 km [2]. Approximately 17 kilometers of the Paraná River stretches along Rosario, and due to this strategically good position near the river it has become one of the biggest ports of Argentina, with international shipping lines. The hinterland around Rosario consists of a large agricultural area and therefore, soy, corn crops and grain are one of the main products that are shipped via the port of Rosario [3]. Additionally, other industries that are found in the port are oil/chemical and (general) cargo, according to data of Marinetraffic [18].

A few decades ago, the port activities were stretched out over the entire riverfront of the city and regulated by the National Port Authority. After a change in governance structures, the ownership of all public port areas went from the Nation to the provinces. For the port of Rosario this is the province of Santa Fe. After this change, the province relocated the port activities to the southern area of the riverfront, to create one concentrated port area to accommodate the increasing demand of export products originating from the Rosario area. In response to the relocation of the port to the south of Rosario, the municipality of Rosario adopted a strategic plan in 1998 called the Rosario Strategic Plan (Plan Estratégico Rosario, PER). The main goal of the plan was to transform the city as well as the riverfront into a modern, sustainable, territorial integrated and socially inclusive city, characterized by culture, innovation and high quality economies with wide national and global connectivity [19]. To make the city future proof for its current and residents, as well as becoming a destination for tourists from across the world. This plan was succeeded in 2008 by The Rosario Metropolitan Rosario Strategic Plan and The Plan de Desarrollo de Turismo Sustentable Rosario in 2010 to further stimulate tourist specific activities.

With the relocation of the port, space and old abandoned port facilities had become available to realise part of this plan along the riverfront. Space that had previously been fenced off and not accessible to the public. So, for the last twenty years the municipality and other private parties have implemented

new functions and initiatives along the riverfront, such as a new public park with walking promenades, places for water and nautical activities as well as housing, hospitality businesses, recreational and cultural facilities in old restored port buildings, as shown in Figures 3.1a and 3.1b. The beginning phases of the redevelopment of the riverfront as part of the strategic plan has shown to be very successful with large amounts of people coming to the riverfront for recreational purposes such as walking, picnicking and exercising. Additionally, the relocation of the port to the southern districts of Rosario stimulated new urban development in the southern districts of Rosario and its surrounding neighborhoods due to the new port activities together with other ongoing initiatives in the area such as the redevelopment of the former Battalion 121, the historic industrial area of the former Swift meat packing plant and the Mangrullo settlement in Tablada [5].

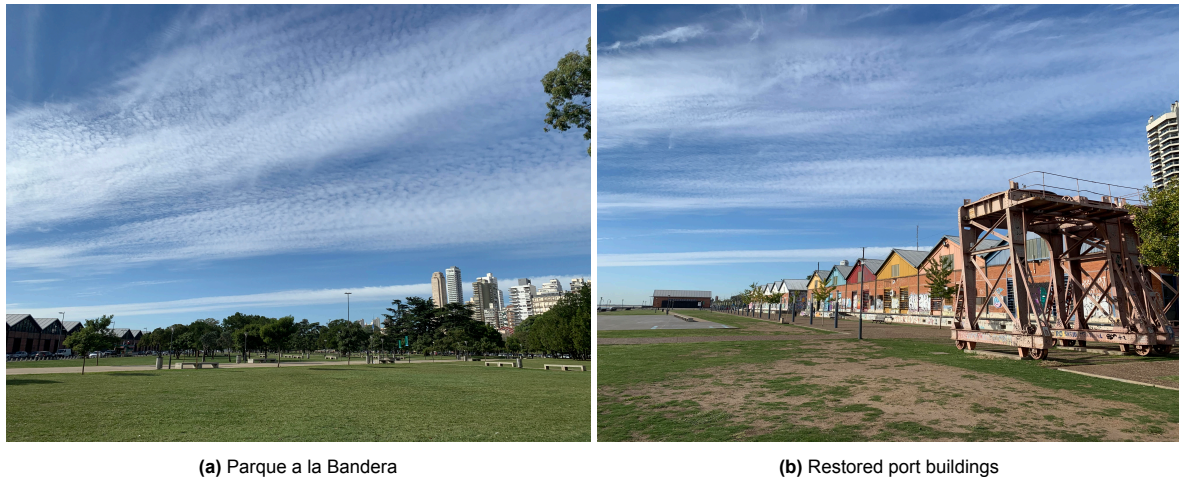


Figure 3.1: Overview parks Rosario

Currently, the municipality of Rosario is following a new strategic plan called La Visión Rosario 2030 which was adopted in 2018 to continue with the previous plans and work out unfinished challenges as well as new challenges that have come along. In La Vision Rosario 2030, the municipality has set out ten strategies to continue transforming Rosario into an inclusive future proof city [5]. The following ten strategies for Rosario to become a;

1. city with fair and high quality living conditions,
2. well-connected city (on the basis of infrastructure, communications and sanitation),
3. accessible city with integrated and sustainable mobility,
4. sustainable and resilient city,
5. productive and innovative city,
6. international tourist city,
7. city of care and integration,
8. multicultural city and educator,
9. city of sports and welfare, and a
10. city of peace and coexistence [5].

The city has also set out several stages in La Vision Rosario 2030, in which the strategies should be fulfilled, of which the first is to recover the relationship with the Paraná River [5]. As mentioned, the relocation of the port has made space available for new activities and functions along the river, which now has been mostly filled with new initiatives such as hospitality businesses, cultural facilities and a large public park, which are more thoroughly described in the next section. Even though this has shown to be successful with large numbers of daily visitors, the relationship between the port and the city is not visible yet and a large number of Rosario citizens do not know the importance of Rosario's port in the past and present. For this reason, the municipality wants to recover the relationship between port and city with the strategic plan of 2030 to increase the awareness of the port by redeveloping the riverfront. This is also a goal of this redevelopment plan, which will be further explained in the next section.

3.2. Current initiatives of riverfront development

For the last twenty years, the municipality of Rosario and other involved parties have been working to realise the past and present strategic plans to make the city a modern, sustainable, territorial integrated and socially inclusive city, characterized by culture, innovation and high quality economies with wide national and global connectivity. Part of this is set out along the riverfront. Besides the realization of the public park along the riverfront, a number of other municipal initiatives have been realised also as part of this. In this section, the different initiatives are described and linked to the corresponding strategies. Additionally, in Appendix B, a map is given which shows the current functions on the Rosarian riverfront and their owner-ships.

Redevelopment is a long-term process where the strategies are achieved in different phases: short, medium and long term. The short term initiatives are already launched by the municipality of Rosario or are planned to be implemented in the near future (between present and two years). This type of initiative will generally have the smallest impact on the environment and requires the smallest investment of resources of the three types of initiatives. When the effect of the initiative will be visible between the two and ten years it is considered medium term. Initiatives that have a long time span (more than ten years) require a relatively long and large investment of resources, and will have the largest impact on the environment of the three types of initiatives. Generally more complex initiatives will fall in this category.

3.2.1. Short-term initiatives

Based on strategy 01 'city with fair and high quality living conditions', the municipality wants to form an integral network in order to form an inclusive vision for the spatial plan. Part of the spatial planning are the renewal of leisure infrastructures and tourist spaces.

International tourist city

The citizens of Rosario and tourists can see the city of Rosario through various modes of transportation. The tours are part of strategy 06 'international tourist city'. The municipality wants to show the territory of Rosario with the rest of the nation and internationally. This entails amongst other things the culture, river and social heritage. Initiatives that are already in place are: a city tour that takes place on the water uses the ship that is called the 'Cuidad de Rosario' and is seen as the main tourist attraction on water. The ship hosted the water tours between the city of Rosario and the upper delta of the Paraná River. Due to the COVID-19 pandemic and the low water levels of the Paraná River there are no tours possible [20]. The tour through Rosario takes place by a tourist bus uses a 'Hop On - Hop Off' service: it has predefined stops at all the main highlights of the city [21]. Furthermore, bicycles can be rented at various places throughout the city, including at the riverfront.

Furthermore, the municipality has realised, by identifying tourism as a strategic sector, that they are searching for more efficient management strategies, for example the involvement of the private sector in the decision making process.

Puerto de la Innovación

Launched in November 2021, the municipality of Rosario already started with a redevelopment of the old port in the center of Rosario. This initiative aims for an enhancement in culture, science and technology, which is part of strategy 05 'productive and innovative city'. The goal of this project is to improve the quality of life of the citizens of Rosario and the position of the city to be a benchmark in knowledge, talent and innovation. To achieve this, the Puerto de la Innovación (Port of Innovation in English) in the city of Rosario was created [22]. The agreement is a cooperation between the province of Santa Fe, the municipality of Rosario, the Argentine civil association Polo Tecnológico Rosario, The stock exchange of Rosario, the Rosario Foundation, the Academy of Medical Sciences of Rosario, the Austral University and the National University of Rosario [23]. Old port buildings along the Rio Paraná in the center of Rosario are used to house functions and activities in relation to the purpose of Puerto de la Innovación.

3.2.2. Mid-term initiatives

Creating an accessible city

Related to strategy 03 'accessible city with integrated and sustainable mobility'. Plans that are already developed by the municipality need to be boosted, such as, regional trains and public transportation within the city of Rosario (e.g. trams, trolleybuses and BRT (Public Rapid Transit Transport System). Awareness is there to support the fact that different types of transportation need to be combined. This relates for example to transportation on land (rail and road) and water (river).

3.2.3. Long-term initiatives

Sustainable and resilient city

Strategy 04, 'sustainable and resilient city', has the circular economy initiative to balance the environmental quality and commit to climate change. This initiative will include the use of renewable energies and closing the life cycle of products, services, materials, water and energy.

Strategic vision public port of Rosario

The public port of Rosario undergoes a project that aims at providing the strategic vision for the port for the next 20 years. Handling a holistic scope that includes amongst others the leasing contracts with the private sector, possible investing options in new infrastructure, port safety related aspects and structural analysis. The project is a collaboration between ENAPRO and Port Consultants Rotterdam.

3.3. Riverfront development problems and improvements

As described in the beginning of the chapter, a lot of actions have been taken to transform the city and its riverfront. However, there are still many problems to be seen in the redevelopment of Rosario's riverfront and much more can be done to achieve the final goal of the municipality vision as well as other stakeholders involved such as Ente Administrador del Puerto (ENAPRO). Examples of problems being landslides and collapsed piers caused by weakening of structures and changing water levels and speed (e.g. water characteristics) [24]. Additionally, a lot of old abandoned port and bank protection structures can be found on the riverfront, and no clear relationship has been established between the riverfront and the city of Rosario. Therefore, it can be concluded that the riverfront has some redeveloping issues. In this section the different problems are identified. After which in the next section a SWOT-analysis is made to summarize these problems together with the strength and possibilities in order to improve these problems along the riverfront.

3.3.1. Missing link between port and city

Riverfront areas are one of the most challenging urban spaces that give a great opportunity for urban development not only for the waterfront context but also for the whole city [8]. Communities around the water bodies are full of unique features, which can support the adaptation of the economic and social conditions of cities. Research of Ali, Mohamed, and Sohafi described that riverfronts become unique places not only for trade, transport, and industry but also as recreational, and entertainment places for residents and visitors. However, the intervention of existing riverfront areas, with or without a history of port activities, is a very critical procedure, and needs a sensitive strategy to regenerate the waterfront of a city.

This can also be said for the redevelopment of the riverfront of Rosario which has been going on for the past twenty years. Currently, there are still a number of areas within the design of the riverfront, for which improvements need to be made to make the redevelopment more successful. A large number of Rosario's residents are not aware that the city's port plays a major role in the agriculture sector of Argentina, now but also in the past. Even though a large number of Rosario's residents make use of the public park along the river. Mainly caused by the riverfront not being accessible to the public in the past, but also the insufficient integration of the riverfront's cultural heritage in the spatial design of the riverfront park. Even though old port warehouses are already used for housing new functions and activities, other port elements in the park are forgotten. For example, the old railway elements that can be found around Paseos N. Kirchner and Comodoro Py, abandoned factories and silos in the north of Rosario along Avenue de la Costa Estanislao López and the old dolphins and crane in the water along the riverfront by Parque de Las Colectividades. Additionally, residents of Rosario are not educated

on the city's past and present role in the Argentine agricultural sector and the port's importance within this. In the educational program of local schools, the port is not discussed in history classes and not a lot of information is made available about the history to the residents throughout the city and along the riverfront. And finally, compared to the riverfront in the north of Rosario which has beaches and public/private harbors, the riverfront in the center of Rosario has less interaction with the water. There are no direct access points for residents to make use of the water for recreational purposes due to lacking boat docking stations for the residents.

As mentioned in Section 2.1, the use of water access and historical buildings has its advantages for renovation and branding of cities, as well as reconnecting people to water by enhancing the local port identities. In other words, enhance the port-city relationship. By doing so, waterfronts have more potential to provide access to new recreation opportunities, public enjoyment and economic development, as well as creating awareness of its historic port identity. This can be done by using port elements which are unique for Rosario. Research by Mohamed and Salim, states that using old port elements will help in preserving a sense of place and improve the quality life among riverfront communities [25]. This will eventually help attract new high standard investments of which cities will benefit socially, economically and environmentally. Rosario also has the potential to enhance this by including the riverfront's cultural heritage of port activities in the spatial design of the riverfront park. So, enhancing the port-city relationship by educating residents and visitors on the riverfront's port history as well as making it a more attractive place to visit with social, economic and environmental benefits.

3.3.2. Problems within the stakeholders framework

Architect M.N. Levin states that two criteria need to be fulfilled for the relocation of a port: "to have land in another place that is conveniently located and in good condition to accommodate port facilities, and b) to reach consensus with the actors involved, to relocate the existing facilities, to dissociate the area of its use as a port and to re-purpose the original piece of land [26]. The latter criterion to re-purpose the land in order to make gains. However, this can only be successfully done if involved actors know their places within the system and are able to communicate, negotiate and in the end reach consensus on the activities that have to be realised to transform the riverfront. Lacking this, is contributing to the spatial and structural problems that are now occurring along the riverfront as well as delays to resolve these problems.

Additionally, the involved stakeholders change over time caused by shifting interests as well as shifting owner-ships of land. As described previously, the riverfront was originally owned and regulated by the National Port Authority. But was later handed over to the province of Santa Fe. Which was followed by the relocation of the port to the south of Rosario after which the central located riverfront ownership was handed over to the municipality. Due to the shifting ownership, the riverfront and its maintenance got assigned to the municipality of Rosario. Unfortunately, additionally to the lack of the second criterion described above, a persistent low water level and a lack of specialized knowledge within the municipality related to the riverfront causes the city to struggle with different problems [24]; the spatial as well as structural problems described above.

Since the Port was transferred from the National Port Authority to the province, the administration and exploitation are managed by ENAPRO. This public non-state port authority was created in 1994 and part of the provincial administration. It leases its terminals to private companies and with the earned concessions they support and promote the development of port activities [4]. However, their specialized knowledge about hydraulic structures and port planning does not reach the municipality due to amongst others a difference in jurisdiction. Chapter 6, further explores the involved stakeholders and the problems within the stakeholder framework in the riverfront development more thoroughly.

3.3.3. Structural riverbank problems

The water level of the Paraná River has changed over the last 15 years, according to data of ENAPRO, based on official measurements of the National Water Institute of Argentina (Instituto Nacional del Agua). Additionally, erosion and a lack of maintenance are possible causes for different problems that occurred in the riverfront. Therefore, in 2020, the municipality of Rosario already did a research towards the current situation of the riverfront. Over this whole area, different problems were recognized and listed in a document [24]. Because this research focuses into a smaller area of Rosario's riverfront, the already recognized problems of the selected area are located and described. An overview of the problems is shown in Figure 3.2.



Figure 3.2: Overview of the embankment problems

Problem 1 - Parque de la Arenera

In 2016, the area of Parque de la Arenera was made more attractive, by adding pedestrian walkways, bike paths, new railings and lighting [27]. Despite this work, riverfront problems were not solved and access to the river is still not possible. Figure 3.3 shows the quay in front of Parque de la Arenera. On the left side, the quay consists of concrete, which should prevent erosion. While on the right side, behind the dolphin, this is not present and erosion is a problem. On this side of the quay, two old structures are also no longer intact. The fluctuating water levels probably make the erosion worse.



Figure 3.3: Parque de la Arenera

Problem 2 - Parque Sunchales

The second problem that is ascribed covers Parque Sunchales, located approximately between Barquito de Papel (paper boat) and The Museum of Contemporary Arts of Rosario. The riverfront in this area contains practically a vertical slope, see Figure 3.4a. The southern part of the riverbank shows reinforced made out masonry walls combined with concrete, more northwards, shotcrete protects the bank (Figure 3.4b). In addition, in some areas grows abandoned vegetation on the slope, without any other bank reinforcement. The toe of the riverbank is protected with stones and rubble. In the river itself are standing several abandoned port structures, most are made of concrete.

On top of the riverbank, a footpath is situated, whereas the southern part does not contain a rainwater drainage system. Over time, a sinkhole appeared, which are repeatedly filled. Uneven settlements occurred and caused an uncontrolled water runoff. Eventually, in 2008, a part of the riverbank protection is reconstructed, after collapsing, due to water accumulation in the park [24].

The first 130 meters from the museum are the most critical [24]. During periods of heavy rainfall, the uncontrolled water runoff could result in erosion or even initiate the sliding of the embankment. Especially in the parts where a lot of sprawl, here the trees weaken the protection and result in a more critical situation.



Figure 3.4: Riverfront problem 2

Problem 3 - Parque de Las Colectividades

The Parque de Las Colectividades has a riverfront that is cut vertically. At its foot, it has some riverbank protection which contains rocks. With the river height as it is right now, the riverbank is stable. However, when the water level increases, the erosion rate increases as well. This could result in gully formation and landslides and eventually there is a potential risk of collapse of structures and even losses of life.



Figure 3.5: Riverfront problem 3 - Parque Las Colectividades

Problem 4 - Club Mitre

The fourth problem in the selected area is located next to Centro Cultural Parque de España and the former Fishing Club Mitre. The wooden piles depicted in Figure 3.6 were used as construction for Club Mitre. These piles can not be used anymore, instead, the Club uses a steel dock for fishing activities. Left of the wooden piles, the soil has started sliding especially due to the low water of the Paraná River. As a consequence of the low water, pressure against the soil reduces leading to instability of the slope. In addition, small waves cause erosion on the slope resulting in a landslide.



Figure 3.6: Riverfront problem 4 - Club Mitre

Problem 5 - Parque Nacional a la Bandera

Following the coast more to the south, a different type of problem arises at Parque Nacional a la Bandera. In contrast to the previously described problems, a stone quay wall has already been applied to withstand landsliding. However, this wall is created such that failure still occurs. Stairs with stones on them were placed on the river bed, while the quay wall and dock were constructed separately from these stairs, such that a gap where water can flow in was created. As indicated in Figure 3.7, the material should connect these two elements of the quay wall. However, this material is eroding due to the lower river and the increasing effect of waves, as a result, the soil above is collapsing and a sinkhole is created.

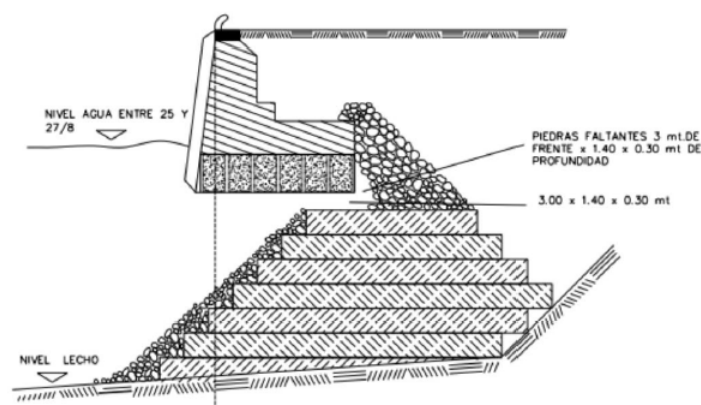


Figure 3.7: Riverfront Parque a la Bandera side view

3.4. SWOT Analysis

In the previous section the spatial and structural problems of the riverfront were described as well as a small summary of the problems within the stakeholder framework. But the riverfront also shows strength and places for improvement of the named problems, which can also be called opportunities. For this reason, a SWOT-analysis is carried out to show all the riverfront strengths, weaknesses, threats and opportunities of the riverfront at this moment in time, in order to identify areas of research and eventually propose new redevelopment plan for (the riverfront).

As described in a paper by Dyson, a process has strengths (which are internal and beneficial for the process), weaknesses (internal and harmful), opportunities (external and beneficial, used to increase value) and threats (external and harmful, may decrease value). Strengths and weaknesses are analysed from within an organization or process (e.g. available human and capital resources). On the other hand, opportunities and threats are obtained externally (political, economic, social, technological and competitive environments). By identifying these four factors of the process, a SWOT analysis can be used to develop strategies that focus on the individual factors.

The SWOT analysis can be extended by pairing the different factors in the following four manners. First, the strengths are used to take advantage of the opportunities. Where an opportunity is an upside risk. For example, taking advantage of the knowledge of all involved actors. Second, use strengths to overcome threats. Where a threat should be seen as a downside risk. Third, overcoming weaknesses by taking advantage of the opportunities. And fourth, weaknesses should be minimized to fight threats. Weaknesses should be managed to make threats less severe [28].

Strengths

- Location along the Rio Paraná River which is an attractive strong visual determinant, catalyzing the city's development and providing recreation spaces.
- Public park with greenery and walkways, developed by the municipality in the past twenty years after it became publicly accessible and in ownership of the municipality.
- Renovation and use of old abandoned port facilities.
- The accessible roads (road way) and connectivity with the city.
- The existence of hospitality businesses and cultural buildings such as hotels, restaurant, market places, educational centers and residential buildings connected to the riverfront park that offer a good opportunity to develop tourism.

Weaknesses

- Structural problems along the riverbank due to a lack of maintenance, such as landslides, sink-holes and collapsed piers.

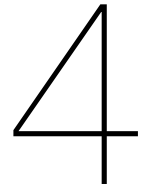
- Bad access to the Rio Paraná River due to lacking public piers and boat docking stations, as well as height difference between park and river for large parts of the riverfront.
- Residential unawareness of past and present port activities, and the importance of it for the country of Argentina.
- Deteriorating old wooden port structures in the river, blocking boat access to the riverfront.
- Poor river quay maintenance due to unclear responsibility.

Opportunities

- The strategic plan La Vision Rosario 2030.
- The potential of becoming a more internationally known tourist destination due to its strategic unique location. Increasing tourism will be an important source of income for hospitality businesses and cultural facilities.
- As well as the potential to become more attractive for its residents for land and water recreation in the center of Rosario instead of only in the south of Rosario.
- Using the old abandoned port facilities along the riverfront and in the river to create more port awareness among the residents and visitors of Rosario.
- Large amounts of space available for adding new functions in the park to attract more visitors to the riverfront.

Threats

- Decreasing water levels due to an increase of upstream water-use combined with the deforestation of the Amazon which consequently causes a decrease in rainfall. As well as the development of hydroelectric facilities in the upstream of the river.
- The need for financial recourse to cover the budget of the development process.
- Weak governmental awareness of the waterfront development problems and weak public participation in the development process.



Redevelopment plan

Based on the conducted research on the current state of the riverfront of the center of Rosario, the scope, a plan is developed for the riverfront of Rosario. This plan contains a new vision for the riverfront to help improve the current state as it is. As mentioned in the previous section this plan falls in line with the current vision and the 10 strategies of the current strategic plan of the municipality of Rosario, La Vision Rosario 2030. And mainly, to recover the relationship with the Paraná River [5]. This chapter elaborates the vision as well as the six initiatives which will help realise this vision.

The scope of this research that entails the section of the riverfront from Nueva Terminal Fluvial until the Maui Towers is limited because of the size of the riverfront of Rosario. This section is selected because of the following arguments. First, the land south of the selected section is owned by the public port of Rosario. Therefore it is not suitable for redevelopment. Second, north of the selected area are many privately owned parts of land that belong to different owners, this will increase the complexity of the stakeholder management and the restoration of the riverbanks. Third, the land within the scope belongs mostly to the municipality of Rosario. Because this redevelopment plan serves port-city integration it is convenient that the land belongs to the municipality. Also, almost all riverbank problems are present in this part of Rosario and are most urgent.

4.1. Vision

The Rosarian riverfront is a former agricultural port along the waterside of the Paraná River. With the relocation of the port to the South of Rosario, it has now become a green public park with numerous cultural and educational facilities as well as hospitality businesses. This was done with the help of the strategic plans of the municipality of Rosario. However, the current riverfront still shows potential for further development to become an even more attractive area in the city of Rosario. Especially, due to its favorable location next to the river and the city as well as large amounts of free space to realise new functions. For this reason a spatial plan has been developed which falls in line and will strengthen the municipality's vision of the city, which is to become a modern, sustainable, territorial integrated and socially inclusive city, characterized by culture, innovation and high quality economies with wide national and global connectivity [21]. This plan focuses on making the riverfront **a safe and accessible place that connects the city and port in a sustainable and innovative way**. The key themes of the vision are described below. Additionally, the vision is illustrated in Figure 4.1 and can also be found Appendix B.2.

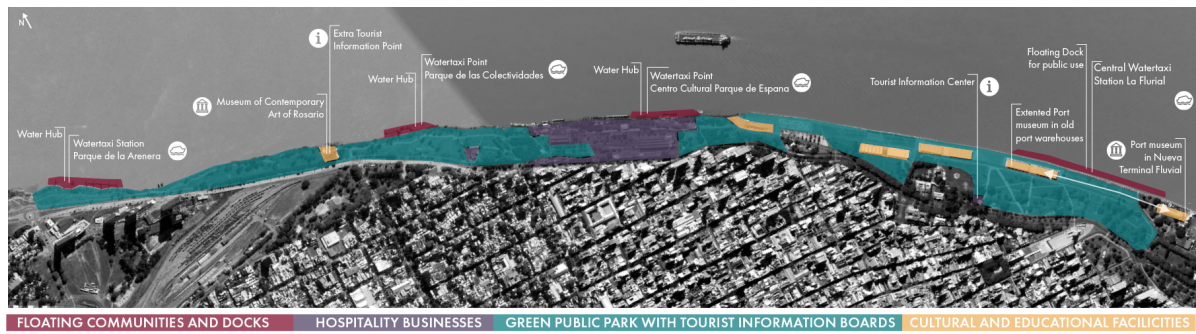


Figure 4.1: New vision map of the Rosario Riverfront [29]

The **safety** of Rosario's residents and visitors is of high importance for the riverfront redevelopment. Especially at this moment, since numerous parts of the river fronts' quay walls are collapsing which can damage the feeling of safety when visiting the riverfront. For this reason, the restoration of the riverbanks is included in this spatial plan.

Restoring the riverbanks of the riverbanks will help the water become more **accessible** to the public. Currently, the water is only accessible in the north of Rosario which is where residents often go to relax. By adding floating docking piers, hop on and hop off points, and water hubs at certain points along the central riverfront, the riverfront will become more accessible for its residents and visitors.

Increasing the accessibility of the river also helps improve the **connectivity** of the city. The strategic position along the riverside creates great potential for adding public water transport to the already existing infrastructure grid of Rosario. Not only increasing the connectivity but also creating another tourist attraction that shows the city from another perspective.

By making the riverfront more accessible and connected, new businesses will be attracted to the riverfront which will help stimulate the **innovative** character of the riverfront. Especially businesses that incorporate circular, sustainable and port elements in their business models, and provide room (and related market incentives) for experiments seeking new innovative solutions on the subject. The innovative character of the riverfront will help create a breeding ground for start-ups and innovative entrepreneurs in the fields of culture, science and technology. Old port buildings which are located along the riverfront can be used to house such businesses.

With the rising awareness of environmental concerns and the effects of sustainable environmental planning. Governments across the globe are continuously investing in environmental regulations and policies to be implemented by businesses, industries, and even households [30]. This also goes for public spaces. For this reason it is important to include **sustainability** in the spatial plan of Rosario's riverfront. Not only by attracting innovative businesses which include circularity and sustainability elements in their business models, but also by reusing elements that already exist along the riverfront. Which not only reduces waste but also shows the riverfront cultural and port heritage.

All seven initiatives contribute to **port and city integration** and enhancing port awareness among the residents and visitors of Rosario. They all draw attention to the Rosario's present and past port activities in their own ways. By making the river more accessible to the public, reusing old port elements to house cultural facilities and (hospitality) businesses or through education. According to research by Mohamed and Salim, regeneration of historic river fronts by using old port elements can help in preserving a sense of place and improve the quality of life among riverfront communities. A sense of place is about creating a unique and special place where people would like to be part of and feel connected to. By understanding the characteristics, such as cultural identity, social activity, physical environment and cultural heritage of a place, helps create this sense of place. Local communities as well as visitors will feel a sense of belonging to the environment, which helps attract visitors to such places [25]. The use of riverfront abandoned elements and infrastructures can create a new and different appreciation of the built environment, creating a new product for cultural consumption. The same goes for the river-

front of Rosario. By making the river more accessible and using old port elements for creating art and recreational attributes as well as housing cultural facilities and (hospitality) businesses can enhance the sense of place for its community which will attract more people to the riverfront while at the same time increase the port awareness among them by adding educational elements to it. Educational elements such as tourist information signs access through the riverfront park and a port museum to educate all that are visiting.

4.2. Initiatives

To strategically transform the Rosario riverfront from its current state of untapped potential, to a more safe and accessible place which delivers solutions on the currently present demands of tourism, innovation, sustainability and connectivity between port and city, much needs to be done. For this reason, this plan proposes six new initiatives which will help realise this vision. These initiatives all contribute to the key themes of the vision in their own way and will add value to the current riverfront as well as the rest of the city of Rosario. The vision also have the potential do add more value to the port of Rosario by becoming more innovative and efficient in the future. Important to note is that these new initiatives would not interfere with the current export and import of the Port of Rosario.

4.2.1. Reuse stranded boats and port elements

As sustainability and innovation are themes of this new vision as well as the municipal current vision called La Vision Rosario 2030, reusing old port elements is central to this plan. Along the riverfront of Rosario, a number of boats are stranded in the water. These boats can be used to increase the port awareness among residents and visitors by locating them along the riverfront boardwalks for people to see. This consequently contributes to port-city integration and recovering the relationship with the Paraná River by creating a sense of place along the riverfront using the riverfront past identity with the use of old port elements. An example of a project which has done this, is the former industrial lot De Ceuvel in Amsterdam. This lot has been transformed into an innovative and sustainability district and multiple old boats have been reused to create a lively venue to enhance the cultural identity of the Dutch city filled with innovation, experimentation and creativity [31].



(a) Re-purposing of old boats at De Ceuvel, Amsterdam [32]



(b) Re-purposing of old boats at De Ceuvel, Amsterdam [32]

As previously described in Section 4.2, the use of unique local characteristics has much-added value in creating a sense of place for local communities, and so improving the quality of life among riverfront communities. By understanding such port characteristics of the riverfront helps create this sense of place. According to Mohamed and Salim, local communities, as well as, visitors will feel a sense of belonging to the environment, which helps attract visitors to such places. The use of riverfront abandoned elements and infrastructures can create a new and different appreciation of the built environment, creating a new product for cultural consumption [25]. This has been shown to be successful for the former industrial lot the Cuevel in Amsterdam. Another example is the High Line in New York in the United States of America; a green park and rail trail created on a former New York Central Railroad spur. As illustrated in Figure 4.3b the designers inter-grated the old rail tracks in the landscaping to show the park's previous functions and create more awareness of the city's history. Additionally, they used a planting design that was inspired by the self-seeded landscape that grew on the out-of-use elevated rail tracks during the 25 years after trains stopped running, and so focused on implementing native

plant species when planting the landscape across the High Line's rail bed [33]. This is an idea that can also be incorporated into the riverfront park landscaping by using the old railroad tracks that can be found along the riverfront, for example in Parque Nacional a la Bandera and Parque de España as shown in Figure 4.3a.



(a) Old train tracks at Parque Nacional a la Bandera



(b) Old train tracks incorporated in the design of the High Line in New York, USA [34]

In Rosario, abandoned boats that can be found in the Paraná River are examples of such unique local characteristics that refer back to the port activities that used to take place along the river in the centre of Rosario. Not only old boats can be used to show the riverfront port's identity. Also, other port elements that can be found along the riverfront can be used to create art and recreational attributes as well as to house cultural facilities and (hospitality) businesses. Examples are old port warehouses, railway elements, dolphins, cranes, and so on. This will help stimulate the port-city integration by re-purposing these elements and bringing more attention to the old port elements. A lot of old port buildings along the centre of Rosario have already been filled with (hospitality) businesses and cultural facilities. An example is the old Distrito Centro 'Antonio Berni' building pictured in Figure 4.4, which was previously used as the central train station of Rosario. Now, it houses recreational and cultural spaces called La Isla de los Inventos. However, a lot of elements are untouched and can still be used in innovative ways to show the port history of Rosario. Especially leaving the centre of Rosario a lot of old buildings are still abandoned and show great potential.



Figure 4.4: La Isla de los Inventos [35]

The initiate of reusing old port elements can be carried out throughout entirety of the redevelopment. The elements are there already but only interest parties need to emerge that want to realise new functions with the port elements, such as abandoned building for cultural facilities and (hospitality) businesses by private parties, old railway elements for art by artists or merely the municipality. In the

end, the municipality also has to grant permission in order to initiate such plans. Since Rosario is an autonomous municipality, giving them the authority to decide on project implementations in Rosario.

4.2.2. Tourist information boards

Along the riverfront, there are different sights that show the previous existence of a great port in the city. Nowadays, these structures are still there but are decayed. As the Port has become smaller and less apparent in the city, the meaning and functions of these older structures along the coastline are forgotten and result in a lack of awareness of the previous importance of these structures in Rosario's history. For this reason, this plan proposed to add tourist information boards together with visible QR codes along the boardwalk next to the riverfront from Nueva Terminal Fluvial (NTF) to the Maui towers. These QR codes will redirect people to information about the structures or a story about the significance of the port. This initiative promotes the connectivity between the port and the city as it increases knowledge and awareness of the port. These information points exist of a QR code solely as it is more a sustainable sign that is vandalism and weatherproof. These QR-codes would be part of a route that could be walked along the riverfront 'Historic Port Walk'. An example for one of the information points could be at the steel ship loading grain tower on the riverfront. This old structure shows the previous existence of the large port and its functions. When citizens and tourists are walking along the boardwalk they can scan the QR-code which will direct them to information or the function of this old structure.



Figure 4.5: QR codes that can redirect one's smartphone to detailed information about site's along the riverfront[29]

This new initiative will stimulate the port-city integration and also bring more education into this zone. This falls in line with the municipal strategies of becoming a tourist city and an educator, strategies 06 and 08 of La Vision 2030. Educating the residents of Rosario on the city's history and the importance of its port in the agriculture sector in Argentina. Not just educating its residents but also tourists that come to the city. By adding these tourist information boards the city will become more equipped for tourists which will help Rosario become an internationally known tourist city.

Currently, there is already an existing walk of the port that includes information points about the port. However, these signs are not vandalism-proof and are only existent in a small zone of the riverfront. It is suggested to extend the walk until the Maui Towers and replace these signs with QR Codes and more visible signs of the different markings/points. This initiative promotes connectivity on different levels between different stakeholders but also between the port and the city as this walk begins from Nueva Terminal Fluvial which is owned by ENAPRO and is set along the riverfront where ownership of land differentiates. This initiative is a collaboration between ENAPRO and the Secretary of Tourism which promotes connectivity and stimulates the collaboration between ENAPRO, the secretary of Tourism and the municipality. The tourist information boards are more easily implemented and are planned for the beginning years of the phasing.

4.2.3. Port Museum

The port museum is part of an educational initiative that promotes awareness among the citizens of Rosario and connects the Port and the City. Just like the tourist information boards, this initiative will stimulate the port-city integration and also add more educational resources to the city which falls in line with the municipal strategies of becoming a tourist city and an educator in La Vision Rosario 2030.

Currently, a port museum does not exist in Rosario even though it is one of the largest ports in Argentina.

In Rosario there are a lot of old structures, however the existence of once a great port is not visible in the city anymore. The port museum would be based in Nueva Terminal Fluvial, a boat operating center owned by ENAPRO. The location of the Port Museum is at Nueva Terminal Fluvial which is owned and operated by ENAPRO. As this location will be the centre point to use the water taxi and bus, it has enough space for an exhibition of the Port's current and past functions, but also its potential function in the future. The port museum would not solely be in the building itself, but would be connected to a walking route next to NFT. Old boats and bigger objects are placed in the water and on the boardwalk next to the riverfront. To show the heritage and significance of the port it used to be. It is recommended to use the older boats that are currently laying on dry shores along the coastline of the Paraná River as this also promotes more sustainability and provides the opportunity to use those areas for new functions for the Port. A Port museum increases the accessibility and connectivity to the Port and is part of a bigger picture that is based in Nueva Terminal Fluvial. The initiative is inspired from FutureLand in Rotterdam, as shown in Figures 4.6 and 4.7. As FutureLand is for educational and recreational purposes and increases the awareness on the port of Rotterdam, it is a great reference to the port museum and other potential functions.



Figure 4.6: FutureLand at Maasvlakte Rotterdam, the Netherlands [36]



Figure 4.7: Boat tours through the Port of Rotterdam conducted by FutureLand [36]

This initiative should be realised by ENAPRO as it will be situated on their property and in consultation with the secretary of Tourism of the municipality. The port museum is planned to be implemented in the first phase of the redevelopment project as it will be set in a existing building with the support of ENAPRO and will generate cash inflow for the organisation to support the other initiatives.

4.2.4. Water taxi-bus

The water taxi-bus is an initiative that is based in Nueva Terminal Fluvial operated by ENAPRO. It will create accessibility to the river for citizens and visitors, but can also grow into a mode of transport to other points along the riverfront of the Parana river. This falls in line with the municipal vision and the two strategies 02 and 03 of becoming a well-connected city through water transport as well as becoming more accessible with integrated and sustainable mobility by using green energy sources to power the water taxis such as biofuels which have gotten a more important role in the Argentine energy production. And of which almost 82 percent of the national biofuels are produced in the province of Santa Fe [37].



Figure 4.8: Water taxi in New York, United States of America [38]

A water taxi or bus with a city on only one side is a well known concept that has been implemented in multiple cities like Rotterdam, Sydney, Antwerp and New York city. There are two versions of the water taxi-bus. The first can be a navigation on the river passing the port with a guide that provides information. This option will fall in line with the port museum that also will be based in Nueva Terminal Fluvial. The second version of the water taxi-bus, will be a way of transport and recreational transport along the coastline. Currently, the city does not have a centralized mode of transport on the water for the city. Thus, a water taxi-bus will not only provide the chance to navigate within the coastal zone of Rosario but also to other port cities along the Paraná River which will increase the mobility for citizens and visitors. These embarking and disembarking points could be combined with the initiative of water hubs which are further elaborated on in section 4.2.5.

The water taxi embarking points are constructed one by one. The redevelopment plan suggests four points of which one is specifically designed to incorporate a water hub. The specific point is situated in Parque de Las Colectividades and will be a floating dock that contains multiple functions. However, to realise the embarking and disembarking point and a water hub, the riverbank needs to be redeveloped as it is currently not safe and blocks access to the river. This is also the case for the other three water taxi points, first, the riverbank is reconstructed which is followed by the construction of the docks for the water taxi. For the construction of the water taxi embarking points, a more specific analysis of the feasibility and design for riverbank redevelopment can be found in Chapter 5.1.

Two of these locations are owned by ENAPRO and two of them by the municipality resulting in a stimulation of collaboration between these entities. Figure 4.1 illustrates the four points within the scope which show the most potential for entry and embarking points for water taxi boats and could potentially become locations for the implementing water hubs. The redevelopment plan recommends focusing on the four indicated locations and possibly on other cities that have these types of stations already. After the four water taxi points in the scope have been realised, there is potential to extend the water taxi service outside of the scope. Figure 4.9, shows locations outside of the scope that shows potential for water taxi points along the Paraná River.



Figure 4.9: Potential for water taxi extension across the riverfront of Rosario [38]

4.2.5. Water hub

A water hub is initiated to increase accessibility to the waterways of the Paraná River. The water hubs will function as small communities on the water which can consist of bars and restaurants. Some water hubs can also be used for the docking of water taxis, water buses and in some cases also private boats. These locations will provide public transport and recreational activities. The suggested water hubs will increase the accessibility and connectivity as most part of the riverfront is now obsolete and damaged. Besides increasing accessibility and connectivity which fall in line with strategies 02 and 03 of La Vision 2030 set out by the municipality, the water hubs will also function as a place of coexistence for the residents and tourist that come to Rosario which falls in line with strategy 10 of the vision. Which all contribute to recovering the relationship with the Rio Paraná; one of the main stages in La Vision Rosario 2030 [5]. Water hubs have already been implemented in harbours across the globe, for example in Puerto Madero in Buenos Aires, Argentina. Figure 4.10 shows a water hub in Puerto Madero which functions as a bar and restaurant where residents and tourist come together to enjoy the scenery while having a drink. In addition, in Paragraph 5.2 an impression (Figure 5.4) is shown how a water could look like at Parque de Las Colectividades.



Figure 4.10: Water hub in Puerto Madero in Buenos Aires, Argentina

In order to realise the water hubs, the quay walls should be repaired or entrance would not be possible. The redevelopment of the riverbank itself is another initiative part of the plan which is directly related to the development of the water hub. As the water-taxi's goal is not only to partially solve the mobility issue of Rosario, it also brings additional value to the tourism and recreational opportunities in Rosario. The water hubs will attract people to go get a drink or take a look out on the Paraná River and see what significance the river and the port have in the city. These floating communities would be port-themed to not only increase the integration but also the awareness amongst the citizens and tourists in Rosario. Besides having additional value to tourism and recreational activities it also provides new jobs and income to the city.

As discussed in the water taxi initiative, the plan will focus on four locations. The first water hub will be set at Parque de Las Colectividades which is also a water taxi point. After the riverbank at Parque de Las Colectividades is restored and the water taxi station and water hub are realised, the other hubs will follow. The riverbanks at every water hub will be restored to ensure safety for its visitors. Where the water hubs will be located, there are still old port structures. These structures will be used in the design of the water hubs to enhance port awareness and reduce waste. Reducing waste is part of the municipals goal to become more sustainable. Chapter 5 will future elaborate the construction of the water hubs and the technical feasibility of them.

4.2.6. Restoring of the riverbanks

The initiative of restoring these banks has two main goals: increasing safety and accessibility. Nowadays, numerous warning signs on unstable and unsafe locations are placed along the riverfront as the riverbanks show many problems. An example is the collapsing quay wall in front of Club Mitre in 2020 as a result of heavy rainfall which will be further elaborated on in Chapter 3.3.3. After numerous events like that of the collapsing quay wall at Club Mitre, the municipality has not taken action to think of solutions and restore the quay's and the areas that now have become unsafe for visitors of the riverfront [39]. Although signs are placed in the parks, they are not evenly distributed and some of them are not even visible. By restoring the riverbanks, the citizens of Rosario and visitors will be able to safely walk on the boardwalks and also enter the city via the water increasing the accessibility to the water along

the riverfront. This falls in line with strategy 03 of La Vision Rosario 2030 as well as strategy 09 by making the city a more safe place and so increasing the well-fare of the residents of Rosario. Currently, the bad state of the riverfront quay wall and the collapsing of of them results from insufficient maintenance. Also, the river can not be entered in these zones, since the chance of collapsing banks is too high. When reconstructing the riverbank, the park can become wider, including zones where the river can be reached again, by for example building safe stairs or floating communities. In order for the implementation of the boat hub and floating docks, the riverbanks will need to be redeveloped or maintained to be a solid basis. A proposal on how the riverbanks can be restored can be found in chapter five, together with a multi-criteria analysis which lead to this proposal. The restoration of the four selected riverbanks will happen sequentially starting with the riverbank along Parque de Las Colectividades, this is set out in the schedule in Section 4.4. Additionally, in Figure 5.4 an impression is shown of how the riverbanks could look when redeveloped and maintained.

4.3. Stakeholder engagement

In order to realise the river redevelopment Rosario plan, stakeholder engagement between different entities is necessary as well as an clear organizational structure. As mentioned in Section 2.5.1, this has shown to be very important in riverfront redevelopments for it to be successfully. Especially, in projects which have a large number of stakeholder such as that of Rosario's riverfront.

As this plan is an initiative that stimulates the co-operation between different stakeholder, the full plan cannot be executed without collaboration on all ends. This plan is partially executed by ENAPRO and partially by the municipality. Funding for this plan can be fulfilled by a collaboration with the Board of Trade, the nation, municipal and provincial funds to initiate the project. With this stakeholder engagement strategy, it not only enforces the collaboration on this redevelopment project but also it stimulates a set decision framework that provides a multi-disciplinary knowledge and collaboration which will ensure a sustainable, well-maintained Rosario. The proposed engagement strategy is based on an extensive stakeholders analysis in Chapter 6 validated by literature and interviews which can be found in Appendix C.

4.4. Time schedule

The plan for the riverfront development will take approximately six years and exists out of two phases in which the initiatives are realised. This is illustrated in Figure 4.11. In this figure an time period is set out per initiative which include the preparation, execution and a buffer period in case of delays.

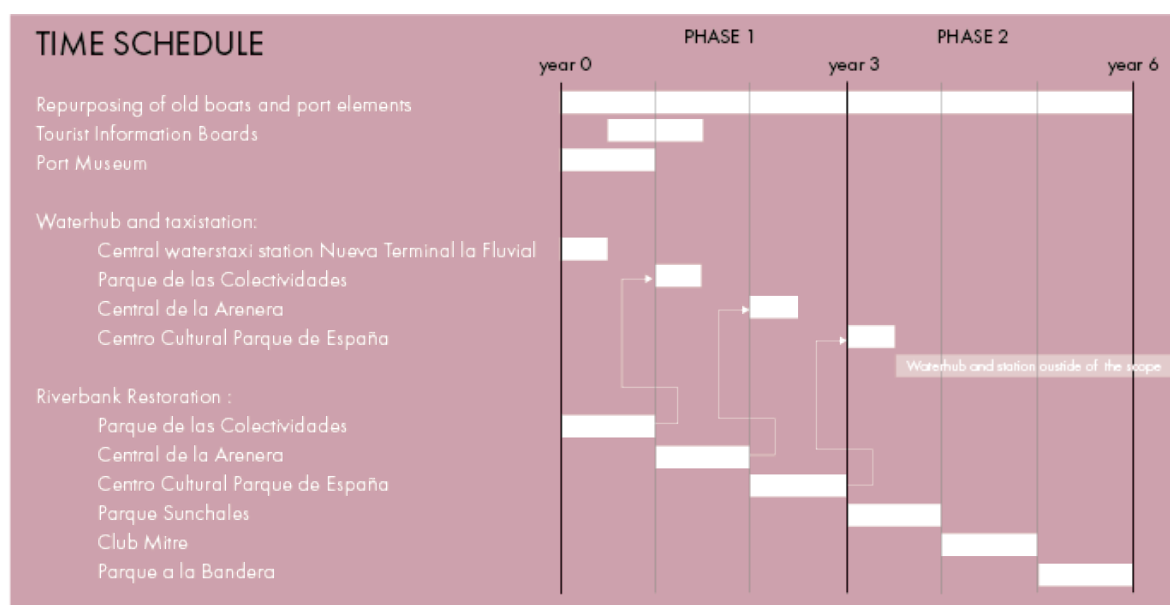


Figure 4.11: Time approximation of the proposed redevelopment plan

The first phase of the plan contains the realisation of the port museum and the tourist information boards which together will create more port awareness through port exhibitions and a historical walk along the riverfront. This phase also includes the realisation of three water taxi stations/points and hubs. These are the stations/points that are connected to the on land city infrastructure along Avenue de la Costa Estanislao López and Avenue Belgrano. These are Nueva Terminal Fluvial, Parque de Las Colectividades and Parque de la Arenera. NTF will be realised first, since this location will function as a focal point for the activities relating to port and city integration such as the historical walk, the water taxis and the port museum. But also because water bank restoration is not necessary for the realisation of this water taxi station. This phases sets out the activities that can be done independently and that can draw funding from different streams.

In phase two, the riverbanks along Parque Sunchales, Club Mitre and Parque Nacional a la Bandera are restored as well as the forth water taxi point and water hub in the scope is constructed, Centro Cultural Parque de España. After the final water taxi station and hub is constructed in the center of Rosario, the construction of water taxi station outside of the scope can start.

Technical Feasibility

As accessibility and safety are two of the main pillars of the riverfront redevelopment plan, the technical feasibility of the different components of the plan needs to be considered too. To do this, first, the optimal way to protect the riverbanks is examined and afterwards some suggestions for a potential design are made. Then, the capacity of the existing structures along the riverfront is determined to check if these structures can be re-used for the new design of the water hub.

5.1. Bank

According to Karmaker and Dutta (2010), one of the main processes for bank erosion is mass failure due to lack of strength of bank materials. This is a result of the loss of individual particles when riverbanks do not have proper protection, as is the case along many stretches of Rosario's riverfront. Furthermore, the erosion process is enhanced by secondary circulation in a river bend. This is a flow perpendicular to the main direction, in which the flow close to the bottom is directed towards the inner bend and close to the surface towards the outer bend [41]. When looking at an overview of the Paraná River in front of Rosario, it is visible that the bend in front of Club Mitre is affected by this type of erosion. Since land is fading away and there is only small section of land between the water and the motorway left. Also, the top view of Figure 5.1 clearly shows the narrowing of the river after the bend. Many studies have shown that water velocity will increase when rivers narrow and as a result erosion will occur. But riverbank erosion not only occurs due to water flow, but also rainfall, soil structure, river morphology and river waves should be taken into account [42]. Since it is already known that rainfall and the soil structure cause big problems for the banks, a solution that prevents erosion and ensures strong soil should be implemented.

The aim of a revetment is to reduce hydraulic loads acting on the soil and to prevent erosion [43]. To create a safer riverfront, revetment should be implemented. The riverfront should be safe for the water hub to be implemented otherwise it is still not accessible to the public and citizens of Rosario. Therefore, a design is made for the quay in front of Parque de Las Colectividades.

The potential types of revetments are compared with different design parameters using the MCA. Then a simple design is made for the best alternative. As already mentioned in Chapter 3.3.3, no problems occur at this location with the current water level. However, when the water rises to a height of 3 meters, the existing quay wall erodes. Planificación y Gestión (2020) also states that the toe should be lifted to a higher level to prevent erosion on the existing quay [24]. Therefore, new protection type is required.

5.1.1. Multi-criteria analysis

In this section, a multi-criteria analysis (MCA) is carried out to determine what alternative is the best solution for the current unmaintained riverbanks. These alternatives are evaluated by scoring different criteria that are important for designing a good bank protection. Based on these criteria, alternatives can be eliminated based on the key pillars of the redevelopment project such as providing accessibility to the river. After the elimination of certain alternatives, the alternatives will be given scores based on the

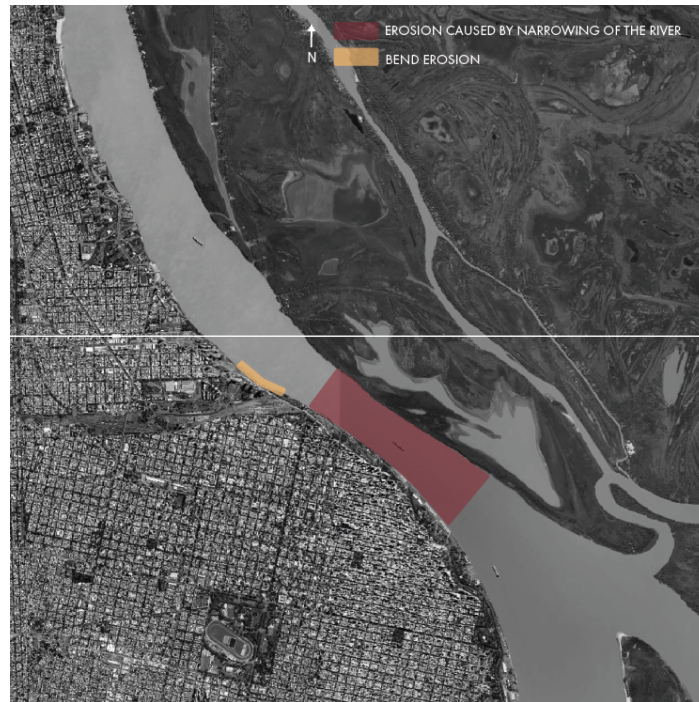


Figure 5.1: Narrow part of the Paraná River

realisation and efficiency of the alternative. By rating the efficiency and realisation of the alternative, the best design solution for the river embankment problems can be further analysed [43]. First, the different criteria are described after which the chosen alternatives are specified. Then the different alternatives are compared to each other in the MCA, given in 5.1.

Alternatives

The different alternatives that are used in the MCA are found in the book of Schiereck and Verhagen, these are the following:

- **Riprap**
Riprap is the placement of (mostly) loose rocks, stones, blocks or debris on the riverbanks for the strengthening of the protection. The advantages of the method is that it is cheaper compared to other methods and it requires less maintenance. A disadvantage is that its aesthetics is not the best.
- **Gabions**
Gabions are metal cages filled with debris or rocks and are often used as earth retaining structures. They are also used to withstand the forces of water onto riverbanks. The gabions are quite flexible and therefore easy to execute [44]. Disadvantages of this alternative are the price, which is quite high, the maintenance it requires and the design.
- **Asphalt**
Asphalt can be, next to its usual use on roads, implemented onto riverbanks. The material is known for its good wave resistance, but the application on a riverbank requires special machinery and regular inspection, according to Schiereck and Verhagen[44]. The material and its construction is cheap, But the aesthetics are quite bad.
- **Sheet piles**
Sheet piles can be executed in many different materials, for example synthetic, wood, concrete and steel. But, for simplification only steel will be dealt with for this analysis. The advantages of sheet piles is that they are strong and due to the material qualities, the lifespan is great. However, the price is a huge disadvantage as sheet piles are often way more expensive than alternative. In addition, environmentally spoken, the alternative is rather worse than others.

- **Concrete quay wall**

Another alternative is to execute the riverbank protection with a concrete quay wall. Concrete is cheap, the design is quite easy. The construction, however, is hard as one needs a casting and one has to wait for the concrete to harden. Additionally, the environmental impact of concrete is rather bad.

- **Bio-Engineering**

Bio-Engineering means the implementation of biological materials to strengthen the revetment of riverbank protection. This can consist of grass, trees, plants or another type of vegetation, as long as it has good coverage of the river bank [44]. Advantages are that it is aesthetical and it is easy to construct. However, a great disadvantage of bio-engineered revetments is that it not has the best resistance against wave loads.

- **Geogrid**

Geogrid is the use of geosynthetic material to strengthen the riverbank. The material is filled with soil to give the riverbank its strength and stability. Geogrid is believed to be aesthetic and the environmental impact of the alternative is low. But, it requires a lot of space and therefore the execution of the alternative is rather bad.

Criteria

The criteria used in the MCA to compare the different alternatives are described as follows:

- **Permissible velocity**

Every alternative has a maximum river velocity until the protection starts to deteriorate. For example, some materials might be not able to resist the erosive forces of the river flow[45]. Not all alternatives will be suitable to withstand these resulting dynamic loads. The resistance against the velocity needs to be such that the structure stays stable. The velocity is given according to Baird et al. [45]. A higher value results in a better score for the alternative.

- **Maintenance**

This criterion describes the frequency of maintenance when it is necessary for every alternative. Maintenance is specified by the activity which is necessary until the construction cannot fulfil its intended function [46]. In this case, maintenance is given in time until it is necessary to regenerate the original function of the construction by conservation, renovation or replacement. The frequency is valued in years, in which a very low frequency gives the best result as it requires the least energy for maintenance. All data is given according to the Dutch institute for applied research in the field of water, named Deltares [46].

- **Lifespan**

The lifespan is the lifetime that an alternative has on average, expressed in years. The values are given according to the Dutch national database for environmental issues [47].

- **Execution**

The intensity of the execution of the alternatives is described, according to Schiereck and Verhaagen[44]. If for example machinery is needed whereof it is hard to access the riverfront then this results in a worse execution score. The difficulty is valued from very high (10) to very low (0). In which a very low execution class gives the best result as it requires the least extra actions needed to execute the alternative.

- **Accessibility of the river**

If the river is accessible for citizens when a defence is executed, this results in a higher value for the riverfront. When an alternative is executed with a vertical wall, for example, the river is not accessible. The accessibility is valued high(10) if the river is accessible and a low score(0) is given if the river is inaccessible.

- **Maximum slope**

As information on the waterway in the Paraná River is not accessible, it is assumed that the further the new structure of the alternative goes into the waterway, the more disruption it will cause. The lower the friction angle the further the waterway is disrupted and the more negative the impact on the river dynamics. Therefore, a higher friction angle results in a better score for the alternative. The angle is defined according to Pilarczyk. [48].

- **Flexibility future adaptation**

During the lifespan of a solution, it could be possible that it does not satisfy its intended function

anymore. For example, the flow of the waterway increases, or the function of the hinterland changes. Therefore, sometimes, it is necessary to adapt the made solution. Flexibility of future adaptation includes the criterion in which way the alternative is possible to adapt. This criterion takes into account: the flexibility of increasing in strength, easily removal possibilities, and the impact if changes should be made. The flexibility is valued high(10) if future enhancements are easy to implement and a low score(0) is given if future enhancements are difficult to implement. The more flexible, the more optimal an alternative is.

- **Environmental impact**

The environmental impact specifies the influence that the alternative has on the climate and the surroundings of the construction. The Dutch national database for environmental issues, "Milieu-database", is used to calculate the differences between the particular methods[47]. Here, the impact of different materials is given. The values are given in euros per m².

Table 5.1: Multi-criteria analysis on river bank protection

	Riprap	Gabions	Asphalt	Sheet pile wall	Concrete wall	Bio-engineering	Geogrid
Permissible velocity (m/s)	6	6.3	>6	>6	>6	1.8	4
Maintenance (year)	25	25	30	25	50	2	15
Lifespan (year)	1000	50	75	1000	1000	15	1000
Execution intensity	2	3	5	6	7	1	5
Accessibility of the river	4	2	9	2	1	7	8
Environmental impact (US\$/m ²)	1.59	13.22	3.57	4.35	12.24	0	0.37
Flexibility future adaptation	6	6	3	4	1	9	5
Maximum slope (degrees)	40	90	40	90	90	40	30

As stated in Chapter 3, the design velocity of the Paraná River is assumed to be equal to 1.0 m/s. Therefore, the alternatives which can withstand high velocities and are quite hard to execute can be eliminated. This applies to sheet pile walls and concrete walls. As for maintenance, sustainability and accessibility are of great importance for the spatial plan, some of the other alternatives can be also ruled out. This is the case for gabions (high environmental impact) and geogrid (high in maintenance). This leads to the following alternatives riprap, asphalt and bio-engineering. All have the same friction angle of 40 degrees, are quite low in environmental impact and their execution intensity is rather low. Riprap is not the most accessible way of protecting the riverbanks, but it is cheap and has a large lifespan. Additionally, it is a possibility to add grass or other vegetation between the loose rocks to. Bio-engineering is more expensive and requires more maintenance than the other alternatives, it is by far the most sustainable option to implement in the riverbanks. The last option is to add asphalt as a revetment on the riverbanks. This requires the least amount of money and maintenance, but, asphalt is the least environment-friendly alternative of the three.

Alternatives selection

The cost of the different alternatives describes all costs to implement it. These are calculated by using the Dutch index for civil works "GWW-kosten"[49]. In this database, estimates for applications can be found here, like defence works for rivers. Costs of material, construction and labour are taken into account, the results can be found in 5.2, All prices are given in US\$ per meter ².

Table 5.2: Estimated costs per alternative

Alternative	Costs(US\$/m ²)
Riprap	40
Asphalt	30
Bio-engineering	120

To select which of the three alternatives is the most efficient and the best to realise in the riverbanks of Rosario, a Cognitive Reliability and Error Analysis Method (CREAM) is performed. In this method, the costs are taken into account as well. The results can be found in 5.3. Every score is given on a scale of 0-10. Where a higher score results in a more efficient or better realisable method. Riprap has a good efficiency rate as its lifespan is the best of the three alternatives. It is also rather cheap and the execution intensity is low which results in a high realisation score. The same applies for asphalt, but its flexibility and environmental impact scores worse than riprap. For bio-engineering, the costs are also

higher and the lifespan is rather bad, therefore the realisation and efficiency is lower than riprap. Out of the table, it can be concluded that riprap is the best way of protecting the riverbank in Rosario.

Table 5.3: Cognitive reliability and error analysis method table

	Efficiency	Realisation	Total
Riprap	8	9	17
Asphalt	8	7	15
Bio-engineering	8	7	15

5.1.2. Rip rap design

In this section, some suggestions for a riprap design of Parque de Las Colectividades are made. Riprap is a bank protection and is made of loose rock. As mentioned above, riprap is already applied to this part of the riverfront. However, this protection is not high enough to protect the existing quay. Therefore, this section describes which parameters should be used and what must be taken into account for further design.

Parameters

To make a design, the stability of loose stones should be examined. However, due to lack of data a lot of assumptions have to be made and this will result in unreliable outcomes. It is assumed that 450 meters of the quay should consist of appropriate protection. When making a design, the following characteristics should be taken into account.

1. Water level change

By knowing the water level, the required height for the protection can be determined. According to the data from the Instituto Nacional del Agua, the mean water level in February was 0.15 meters level below the zero of the hydrometer of Puerto Rosario measured at Club Náutico Ministerio Obras Públicas (MOP) [50]. So this water level should not have caused problem for the quay. However, a maximum water level and the maximum wave height should be determined, in order to establish the final required protection height of the quay. The maximum water level in the Paraná River in the past 14 years is 5.6 meters above the zero of Puerto Rosario, according to data from Instituto Nacional del Agua. Rosario's municipality assumes a maximum water level of +6 meters. Moreover, the lowest water level in the last 14 years is measured on -0.5 meters according to the Instituto Nacional del Agua. Therefore, the revetment should be placed at a minimum depth of 1.0 meters under zero, including a safety factor. However, the slope of the river should also be taken into account before this conclusion can be made.

2. Currents

The main river characteristic is the effect of the currents on the bank. A way to measure the stability is by defining a critical velocity, if this velocity is exceeded erosion takes place and the bank is not stable [43]. This value should be determined with measurements. The municipality assumes a velocity of 1 m/s 20 to 30 meters from the coasts, however it is stated that these velocity are not significant and can not be used to measure the stability [24]. Therefore, more research on the currents is required.

3. Waves

Waves should be taken into account, since it is a threat for river banks [44]. As already described above, waves are generated by two process: wind and ship-induced. Wind waves depend on the wind speed, storm duration and fetch. In Rosario, wind wave heights of 0.8 meters are assumed. Although the navigation channel is close to the coast in Rosario, it is assumed that ship-induced waves have less effect than wind waves [24].

4. Cross section

The municipality already made a cross section of the Parque de Las Colectividades bank, shown in Figure 5.2. It shows that when taking a maximum height of +6.8 and depth of -30 below the zero of Puerto Rosario the slope of the riprap should be 1:1.94. This is acceptable, since CIRIA states that river slopes should not exceed 1:1.5 [51].

As mentioned in the water level change, it is required to know the cross section before it is decided to which depth the revetment must be made. The cross section shows that the bank reaches a

depth of -30 below the zero of Puerto Rosario over a length of 70 meter. This length is probably too long to cover completely. Therefore, a retaining element can be applied to the toe. But this toe should be at a sufficient depth to withstand scour [43]. The maximum scour level can not be determined. Also, depth of the existing riprap is not known for this research. This depth should be taken into consideration when designing a new protection.

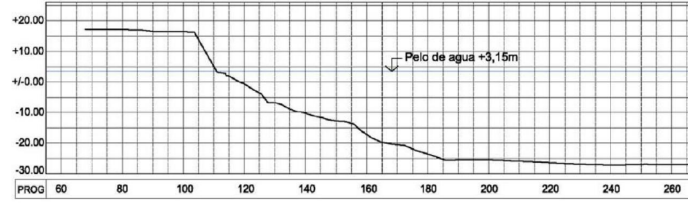


Figure 5.2: Cross section bank Parque de Las Colectividades

When the above parameters are known, an estimate of the stability can be made. This is done by determining the stone size of the rocks. Since there is probably a non-uniform flow, the following formula could be used.

$$d = \frac{K_v^2 \cdot \bar{u}_c^2}{K_s \cdot \Psi_c \cdot \Delta \cdot C^2} \quad (5.1)$$

In which:

- K_v the velocity coefficient is and higher is than 1 for a decelerating flow.
- K_s is the slope correction factor. In Rosario the flow is perpendicular to the flow, so $K(\alpha) = \sqrt{1 - \frac{\sin^2 \alpha}{\sin^2 \phi}}$ can be used. Where α the slope angle is and ϕ the angle of repose is, which should be lower than the slope value to remain stable.
- $\bar{u}_c^2$ the critical, depth-averaged, velocity in uniform flow.
- C the Chezy-coefficient, indicating the roughness. $C = 18 \log(12R/k_r)$ where $k_r = 2d_{n50}$ is and should be iterated. R is the hydraulic radius which is the cross section divided by the wetted perimeter.
- Δ the relative density $\frac{(\rho_s - \rho_w)}{\rho_w}$. With ρ_s the density of sediment and the ρ_w the density of water.
- Ψ_c the threshold-of-motion parameter, indication how much motion may occur. For bed protections, no losses of material is acceptable and a Ψ_c of 0.03 can be used.

Since too many assumptions should be made, this formula would not yet give a probable result. Therefore, more information is required. Also, many other formulas can be used and should be examined before making a probable design. In addition to that, some other factor for this particular situation should be taken into account.

Filter

When applying a riprap protection, it is necessary to place a geotextile and filter under the rock armour layer. This to prevent washing away of material under the armour layer, so that underlying grains can not pass the pores of the layer lying above. The stability of a granular filter can be checked with the following formula:

$$\frac{d_{15F}}{d_{85B}} < 5 \quad (5.2)$$

So in order to have a stable filter, the grains of which 15% passes a sieve in the filter should be five times smaller than the largest grains of the base layer. However, for permeability it is the other way around [44].

Scour around detached bodies

Furthermore, scour around the existing structures should be taken into account. Therefore, probably larger stone sizes are required at these locations.

Stability problems

Another aspect that should be taken into account is the local stability problems, such as piping or bank failure [51]. As also stated in Chapter 3.3.3, rain can cause problems for some parts of the riverfront. If no drainage system is applied, while stabilising the banks, the rain can not flow away and landslide can occur.

An example of how the riprap can be constructed is shown in Figure 5.3.

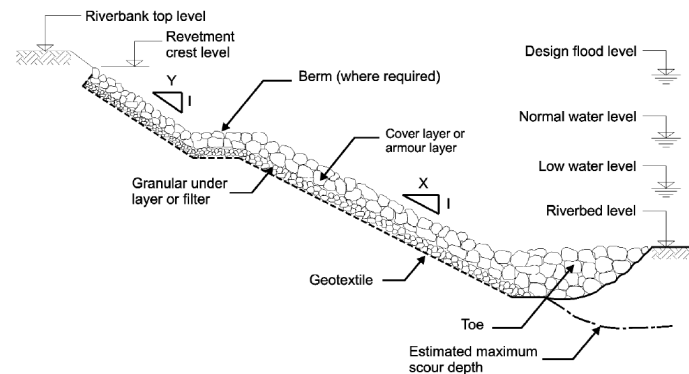


Figure 5.3: Possible riprap design [51]

These factors apply solely to Parque de Las Colectivades. For the restoration of other banks along the riverfront, different factors should be taken into account. However, the parameters defined above should be known for each specific location.

5.2. Water Hub

To realise a water hub as shown on Figure 5.4, it needs to be feasible. To strengthen the spatial plan, the most important initiatives are subjected to a technical feasibility. First, the current state and capacity of the existing port structures, that are situated in the river within the project boundaries, are examined. Second, the pile capacity is approximated. The floating dock design will be elaborated in technical way. And as last, based on a multi criteria analysis the best riverbank solution is given.

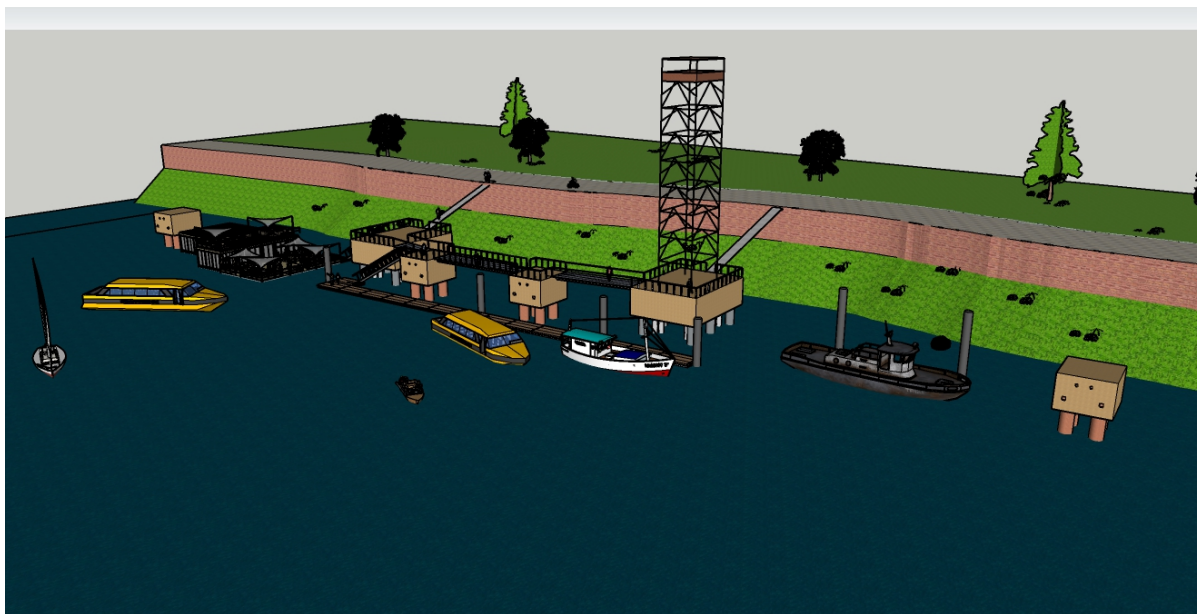


Figure 5.4: Render water hub Parque de Las Colectivades

5.2.1. Structures

Determining the structural capacity is often done when the structures' use-phase is ending and new purposes are given to the structures. Such capacity analysis requires lots of necessary information. However, especially with older structures, essential information is sometimes missing. When this is the case, another way of gathering information should be found. In The Netherlands, there are few institutes and organisations that have written articles or reports about determining the capacity of existing structures. Two of those are NEN and CUR. In NEN report NEN8700: assessment of existing structures in case of reconstruction and disapproval[52], an approach is described to determine the capacity of an existing structure. In addition, the CUR 121 outlined a method to determine the expected lower-bound for the remaining service-life of reinforced concrete structures. Thereby is assumed that the reinforcement is still intact. According to the CUR 121, it is advised to use expert judgment to determine the critical parts depending on the findings of a visual inspection [53]. As no structural information is found about the structures, the method the CUR is used. First, a visual inspection is executed, thereafter, the pile capacity is calculated based on the available information.

5.2.2. Current state structures

Due to a lack of available data, a visual inspection is carried out, in order to determine the current state of the structures. In addition, the low water resulted in difficulties to execute the inspection. However, during the inspection two dolphins are screened on the amount of deterioration, and corrosion. After the visual inspection the critical parts are chosen to check whether the capacity is sufficient in order to fulfill the new purpose, as prescribed by CUR121 [53].

Parque de la Arenera

The northernmost structure is located in front of the Maui Towers. Figure 5.5 shows that it consists of five concrete blocks, each supported by four steel piles. The center-to-center distance between the piles is approximately 3.8 meter and have a diameter of 0.6 meter. Moreover, the blocks are connected by reinforced concrete beams, which are also applied to the quay. These blocks are better known as dolphins and had the function of mooring vessels in the past.



Figure 5.5: Structure in front of Maui Tower

Concrete dolphin

Figure 5.6 shows a close-up of two dolphins. Where the left most dolphin is connected by three concrete beams, two with the quay and one with another dolphin. All blocks have approximately similar dimensions, 5 meters by 9 meters. Moreover, the three most middle blocks are solely connected by one beam with the quay and two on each side to the other dolphins. Solely small cracks in the concrete are visible but are not appointable. Therefore the concrete itself is in a good state.



(a) Left most dolphin



(b) Middle dolphin

Figure 5.6: Dolphins**Foundation piles**

According to Figure 5.7, it could be concluded that the pile consist of approximately 32 steel reinforcement bars with a diameter of 16 mm and filled with concrete. Although steel is affected by corrosion, the concrete inside does not have to be affected. In order to prevent further degradation this pile should be repaired before given the dolphin an other function.

**Figure 5.7:** Close-up supporting pile

Connection beam

Figure 5.8 shows the connection between the first two dolphins. The concrete beam shows deterioration along the upper flange. Reinforcement bars are visible and have a diameter of approximately 10 mm. Still, the lower parts of the beam shows almost no degradation, which means that its field moment capacity is not affected that much. Thus, taking into consideration some repairing, the beams are assumed to be in good shape.



Figure 5.8: Connection dolphins

Parque de Las Colectividades

In front of Parque de Las Colectividades a structure similar to the one in front of Parque Sunchales is located. As well as, for the previous described construction, it consists of dolphins to moor vessels. Figure 5.9 shows five concrete dolphins, of which three are of square shape and two are of rectangular shape. Next to these five dolphins a sixth square block is located on the left side, but is not visible on the figure. Furthermore, steel is applied to connect the dolphins with each other and the quay and a tower made out of steel is present on one of the dolphins. In the past, the tower and dolphins were used for agriculture activities and to load and unload vessels.



Figure 5.9: Structure in front of Parque de Las Colectividades

Concrete Dolphins

The most left dolphin is shown at the left image of Figure 5.10. It can be seen that there are steel details processed in the concrete, these were used to for mooring of the boats. The dolphins are quite aged right now, therefore a couple signs of deterioration can be seen in the concrete. Figure 5.10 shows in the right image that the concrete is cracked at a couple of places. However, the reinforcement is still covered.



Figure 5.10: Concrete dolphins

Foundation piles

Both dolphin shapes have different pile characteristics. The rectangular shaped dolphins have a total of 6 piles with a 600 millimeter cross section. Besides the six larger piles, the structures contains additional piles to transfer the forces of the steel tower on top. The squared shaped structures contains four larger piles with a diameter of 1300 millimeter. A few piles show a outer steel cover, as can be seen in Figure 5.11c. However, testing the compactness with the hammer, showed that the piles are executed as reinforced concrete piles with a non structural steel sleeve. Additionally, at other foundation piles the steel was such corroded that the concrete was visible. Most piles showed almost no deterioration, still some needs to be repaired.

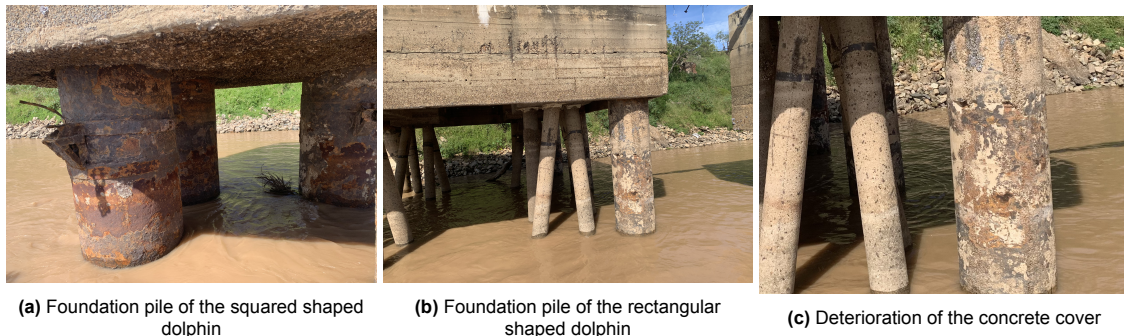


Figure 5.11: Foundation piles of squared and rectangular shaped dolphins

Ship loading grain tower

On top of the second dolphin, an old ship loading grain tower is located. When this part of the riverfront was still in use for port activities, the tower was used to load ships with grain. This is not the case anymore. The tower is shown in Figure 5.12. It can be seen that the tower consists mainly of steel elements for columns, beams, stability members and stairs all the way to the top of the structure.



Figure 5.12: Ship loading grain tower

Some of the stability members are missing in the construction. In addition, most of the members are eroded and therefore contain a rust. Also, The foundation of the tower can be seen in the Figure 5.13. The tower is founded on its own piles, different from the ones of the dolphin. In the figure it can be seen that these piles are in a quite poor condition.



Figure 5.13: Foundation grain tower

Steel Frame Bridges

Between the dolphins, steel frames are located. These were used for transportation when the dolphins and grain tower were still in operation. The bridge between the first and second dolphin is shown on the left of Figure 5.14. The (collapsed) bridge between the fourth and fifth dolphin can be seen on the right of Figure 5.14. Both bridges are approximately 40 meters long and consist of steel circular hollow



Figure 5.15: Close view of the collapsed bridge

sections.

Both structures show major signs of corrosion. Especially the bridge between dolphins four and five. Figure 5.15 shows that the bridge is in a bad shape. The steel is flaking and some members of the frame are corroded such that they are split into two. It can be concluded that the re-usability of the steel constructions can be disregarded.



Figure 5.14: Bridges between the dolphins

5.2.3. Capacity of structures

After the visual inspection, the critical parts of the structures have been established. It could be concluded that the concrete blocks of both dolphins seem to be designed with such robustness, that no extremely deterioration is visible. As a result, the concrete blocks are assumed not to be critical. By contrast, the foundation piles show way more degradation. And need the be examined.

Regarding the current phase of the design combined with a lack of data, a simplified calculation is executed to find the rest capacity of the dolphins. From a previous investigation in 2012, accomplished by Incociv Consulting [54] and commissioned by the municipality, a standard penetration test (SPT) of the embankment were done. Such an SPT registers the amount of penetration that leads to a soil type. Such a test is not sufficient enough to calculate cone resistance, which is needed in order to calculate the pile capacity. The solution is found in the relation between an SPT and a cone penetration test (CPT). Jarushi investigated the relation between SPT and CPT. The outcome is a cone resistance founded on the number of penetrations and soil type [55].

The number of penetration tests nearby the dolphin of Parque de Las Colectividades and Parque de la Arenera are 38 and 32 respectively. The depth of the piles is assumed to be on the boundary of the dense and very dense sand. Therefore the pile depths are 6 and 3 meter. The relation between the

cone resistance and number of penetrations is described as:

$$q_c = 0.291 \cdot N + 2.430 \quad (5.3)$$

[55]. As the relation has a correlation of 0.6 it can be assumed to be quit adequate. Filling in the number of penetrations out of the SPT, the cone resistances have values of 13.5 N/mm^2 and 11.7 N/mm^2 . To end up with a design cone resistant, shape and safety factors are taken into account. The piles are assumed to be drilled during execution, as it gives the most conservative shape factor (of 0.5). Multiplying the design cone resistance with the area gives the total design pile capacity.

After the structures fulfill their new function, citizens and visitors will be able to walk on the structure. Consequently, besides its self-weight, the old port structures must carry the force of a walkway filled with people. Both dolphins would be able to satisfy the new function as a foundation of the water hub. The pile capacity is calculated according to the equation below, where A presents the cross-sectional area of the pile, β the pile shape factor, n the amount of pile per dolphin and q_c the cone resistance. Table 5.4 displays the values of calculation. It results that the three examined dolphins have a sufficient capacity in order to fulfil their future function.

$$F_{Rd,c} = \frac{0.72 \cdot \beta \cdot n \cdot A \cdot q_c}{1.2} \quad (5.4)$$

Because solely one SPT is performed per location the force should be reduced, also, according to the NEN 1997-1 the capacity should be reduced by the factor of 1.2 due to safety.

Table 5.4: Overview calculation pile capacity

Location	Parque de la Arenera	Parque de Las Colectividades 4-pile dolphin	Parque de Las Colectividades 6-pile dolphin
Pile diameter [mm]	600	1300	600
Amount of piles	4	4	6
Soil type	Fine sand	Fine sand	Fine sand
Amount of penetration	32 ^[1]	38 ^[2]	38 ^[2]
Cone resistance [N/mm^2]	11.7	13.5	13.5
Pile shape factor	0.5 ^[3]	0.5 ^[3]	0.5 ^[3]
Pile capacity Design value [kN]	3984	21484	6864
Load - self weight [kN]	2335	3821	2354
Load - walkway [kN]	225	450	660
Total load Design value [kN]	3139	5261	3815
Sufficient capacity	Yes	Yes	Yes

[1] amount of penetration based on pile depth of 3 meter

[2] amount of penetration based on pile depth of 6 meter

[3] pile factor based on drilled foundation piles

5.3. Floating docks

Another part of the water hub is the floating dock. As Paragraph 4.2.5 describes, the dock should be accessible during the whole year. That is the reason for choosing a floating dock. Independent from the water level in the Paraná River, boats are always able to moor at the dock. The design of the dock will be one straight line of smaller floating elements parallel to the riverbank. This results in a few advantages.

Designing the floating docks parallel to the riverbanks result in less disturbance to the surrounding, because the river flows easier along the dock compared with a perpendicular located dock. In addition, the water taxis and busses are able to arrive and depart faster, which increases efficiency. Floating docks can be executed with a lot of different materials and designs, which results that even for a small

budget a floating dock can be constructed. Also, during the construction stage, all parts can be built at another location to decrease the inaccessibility of the river

The floating docks are designed such that water taxis, busses and private boats should all be able to moor at the floating docks, for that reason the length should be at least 60 meters, based on an averaged water bus [56]. Due to the length and depending on the location of the floating dock, it should have its own stability system. In the boat hub design, shown in Figure 5.4 the floating dock is supported by three steel piles. The forces from the docking boats will be transferred through the dock to the piles. Also, the piles are preventing rotating and ensure the capability of ascending and descending the dock during different water levels.

Stakeholder engagement plan

This chapter discusses the necessary engagement between different stakeholder for the redevelopment plan. As different stakeholders are involved in the redevelopment of the riverfront, they all have different needs, visions, responsibilities and views. According to Institute, the plan "identifies the strategies and actions required to promote productive involvement of stakeholders in decision making and execution" [57]. At this stage of the project, the strategies and actions will be broadly framed on the actors that should engage with each other and who should be involved at what moment in time. This chapter consists of a stakeholder analysis, that puts all related stakeholders on the map and evaluates and analyses position and view based on literature and conducted interviews.

6.1. Stakeholder Analysis

The stakeholder analysis describes the current state of the riverfront based on a general scan of the governmental system in Argentina and a stakeholder analysis. Hereafter, the stakeholder analysis is narrowed down through a formal analysis to determine what formal relations exist between these stakeholders that are relevant for the riverfront redevelopment. Based on secondary data and literature a decision framework is created to investigate how each stakeholders views this process and how engagement can be stimulated within decision-making. Finally, the actors are mapped in a salience-position matrix in order to track them over time. Both the decision framework and the matrix are validated by means of semi-structured interviews. The interviews can be found in Appendix C.

6.1.1. Organisational structure

In order to create an open process where no parties are excluded or forgotten, which could in the end increase the power of the involved stakeholders, the initial stakeholder analysis is performed broadly. This is important because a redevelopment has a complex nature with many actors involved [14]. Therefore, first a general scan of the governmental system in Argentina is carried out and is shown in Figure 6.1. Next, some of the main actors in the governmental system are briefly described.

National State Government

The National State Government, also called 'Nation' holds the highest power in Argentina. It consists of three powers: An executive power, a legislative power and a judicial power. However, Argentina is a federal country and the provinces respond to the National government but also self-rule. Within the nation there are 19 ministries that are governed by the executive power of the nation [58].

Ministry of Transport

The ministry of transport has different aspects they are responsible for. The ports and waterways of Argentina are one of them. The ministry is divided into different departments that are all responsible for a different mode of transport. The general administration of ports monitors, maintains and regulates the waterway of the Paraná River. In the ministry of Transport there is an undersecretariat of ports and waterways. However, this organisation is an overarching name for different departments that are connected to construction, logistics and transport on waterways. The Dirección Nacional de Puertos is

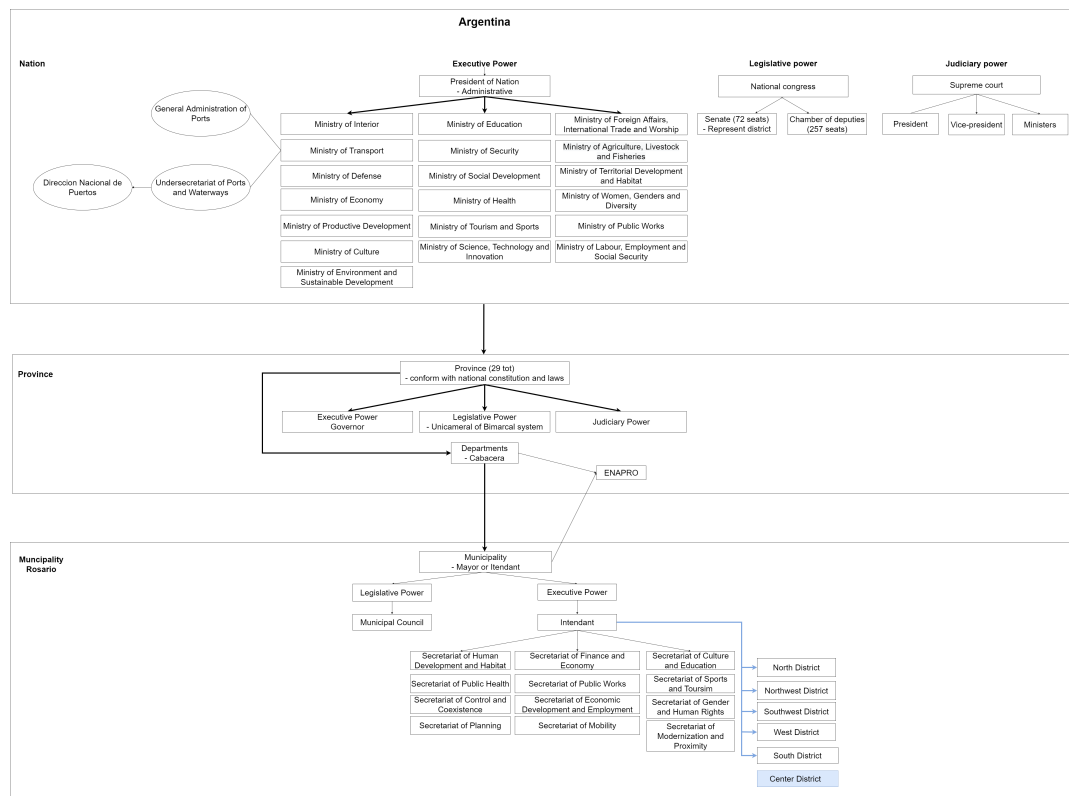


Figure 6.1: General Overview Government.

the main authority that approves permits for constructions on the riverfront or anything related to the constructions in the Paraná River [59].

Province of Santa Fe

The province of Santa Fe is one of the 23 provinces in Argentina. Each province has a constitution that consists of its own administration and municipal independence. In each province there are three chosen authorities: Governor, Legislator and provincial officers. The province can work through local institutions but is also allowed to collaborate with international parties and enter international agreements as long as it follows the rules of the National government. provinces are not allowed to implement new treaties that include politics, navigation laws, customs, tax and commercial laws without approval of the National Government. The province consists of 20 different ministries. The province of Santa Fe its constitution does not outline the functions, goals and characteristics of the jurisdiction of the municipalities [60].

Municipality of Rosario

The municipality of Rosario manages the administration of Rosario and prioritises the basic needs of the community of Rosario. The municipality is autonomous and can be seen as a set of institutions aiding the local government with the citizens of the city in mind. These institutions are secretaries that have a specific focus. The municipality was created by the province with a given justice system. As the constitution of Santa Fe does not conceptualise what is understood as a municipality. Art. 106 of the constitution of the province of Santa Fe does not state the responsibilities and functions of a municipality. The powers of the municipality of Rosario are defined by the Organic Law of Municipalities No. 2,756, Art. 1. According to this law the power and duties of the municipality are:

- tax authorities;
- public works: widening and opening of streets; new squares, walks, parks, avenues; construction of roads, bridges, etc.;
- security: preventive measures to avoid floods, fires, etc.;

- circulation and transit;
- beneficence and public morality;
- promote the hygiene of the municipality, promote disinfection;
- physical Culture and Sports in general;
- management [61].

Province of Entre Rios

The province of Entre Rios is situated on the other side of the Paraná River. They are also responsible for the maintenance of public works. Thus, are important to take in account when looking at possible redevelopments in the Paraná River and its riverfront on the Santa Fe side [62].

Ente Administrador Puerto Rosario (ENAPRO)

ENAPRO is responsible for the administration and exploitation of the public port of Rosario. This public non-state port authority was created in 1994 and part of the provincial administration (Santa Fe - Strategies and Capacities for a Competitive Global Insertion). ENAPRO leases its terminals to private companies. Through these concessions they also support and promote the development of port activities. ENAPRO does not have any governmental powers but compiles and can enforce health and environmental protection regulations. The organisation collaborates with governmental entities such as the Ministries of Environment and Climate Change, Transportation and Infrastructure. Also, the Undersecretariat for Ports and Waterways and the Argentine Naval Prefecture. The main responsibilities of ENAPRO: Coordination of all services provided to navigation, ships and cargo. Management and operation of the port, the dredging, beaconing and toll issues that affect its competence. Grant authorizations, permits and authorizations. Promote the use of the port and water transport. Integrate the port and the city and optimise the communication between the public and private actors [4].

Board of Trade of Rosario (BCR)

The Board of Trade of Rosario is a non-profit organisation that has commissions in a wide range of disciplines. BCR facilitates the investment process and is not involved in the actual investment. As organisation they represent the private sector to talk to the (local) government(s). Missions of BCR involve the establishment and growth of markets; operate in dispute resolution; provide quality analyses and certification; contribute to economic development of the region; actively participates in consolidating the Rosario Region as leader in agro-industry; and are linked to economic, social, educational and cultural development of society [63].

6.1.2. Formal relationships of actors involved

For further analysis, the scope of stakeholders is narrowed down a formal chart often used in policy analysis for multi actor problems. [64] that shows the different relations between stakeholders related to the Rosario riverfront. The formal chart is based on the general scan of the governmental system in Argentina. In Figure 6.2, the chart is shown that represents the formal relations between different entities that have a possible influence on a potential redevelopment along the riverfront. This chart is given as it shows the governmental framework in Rosario and the power relations each stakeholder has to another.

From Figure 6.2 the power and the type of relations can be derived for the key stakeholders are identified. Rosario is an autonomous municipality, which gives the municipality them the authority to decide on project implementations in Rosario. The province of Santa Fe decides on projects that are related to their ministries or to provincial entities. The formal chart gives an indication to what parties hold authority in making decision for projects. This knowledge is further used in the decision framework.

6.1.3. Decision framework

A decision framework describes how stakeholders in a process are engaged, make decisions and which stakeholders are involved in the process at what moment and also how they view their own decision making process. To propose a decision framework as a strategy, first the current decision framework in terms of a timeline and structure is analysed for each stakeholder. This is based on secondary data in the form of publicly reported information on the stakeholders. Secondly, because of the long time span of a redevelopment project it is important to analyse project stakeholder dynamics through examining the changes in the degree of stakeholders' salience attributes (power, legitimacy, urgency)

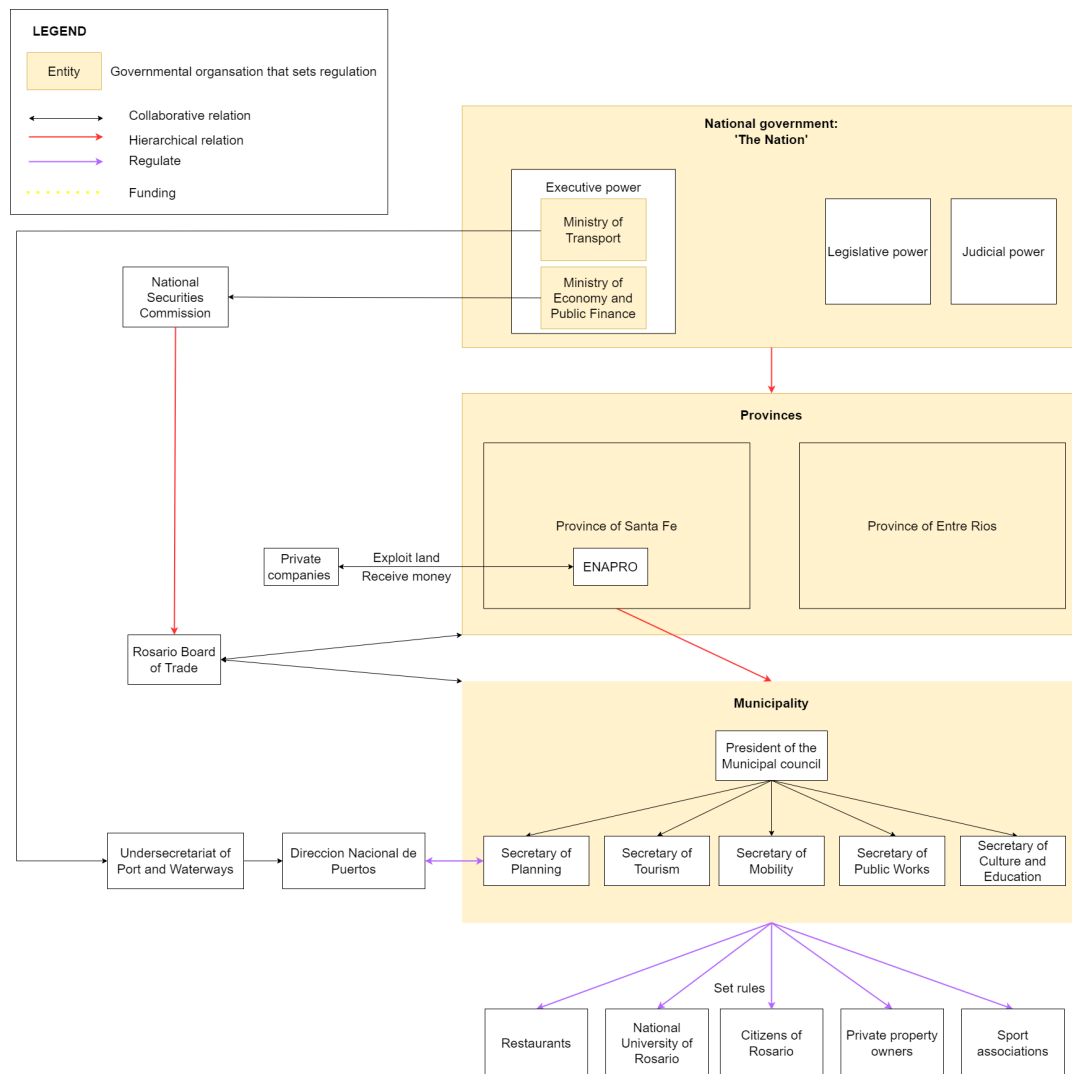


Figure 6.2: Formal chart

and in stakeholders' stance toward the project (i.e., the degree of supportiveness toward the project). Complementary interviews are conducted to offer a more detailed and complete picture of the projects' stakeholder their view on the framework and their dynamics and how it differentiates resulting in the lack of collaboration. This will also serve as an avenue for validating the analysis.

The goal of the decision framework is to show how the stakeholders should engage in order for the riverfront to be maintained and to stimulate port-city integration. Figure 6.3 shows us how decisions currently are made for constructions and developments along the riverfront. Until now each stakeholder has no specific team that has civil engineering knowledge on ports and waterways, therefore it shows that there is a need for engagement with other organisations that have this technical knowledge.

The view of each stakeholder on the decision framework and the current strategy will be analysed and implemented into a more extensive engagement strategy which is based on the interviews in Appendix C. Each stakeholder believes that they have to ask a different entity for permission to implement the project. Ultimately, based on the interviews, the governor of the province and the nation decide what projects are taken on. After that depending on who initiates the project, the related secretaries of the municipality are involved. ENAPRO is only involved in projects when they initiate a project or when other entities ask them to participate as they do not have authority in any other projects belonging to other entities. However, they are one of the few entities that have knowledge on ports and waterways.

Therefore, the suggested framework creates space for ENAPRO to act as a consultant in the decision making process. At last, the sub-secretary or the Direccion Nacional de Puertos is shown the plans and will give the final permission for the plans. However, this entity is responsible for all waterways in Argentina and can deny permission even when all background research has been done. Thus, it is recommended to approach them in the beginning of the decision-making. The Board of Trade does not have any influence in the decision making as previously thought based on research and therefore is placed as a stimulating actor. In Figure 6.3, the final decision-making framework is shown based on interviews and decision frameworks in Appendix C.

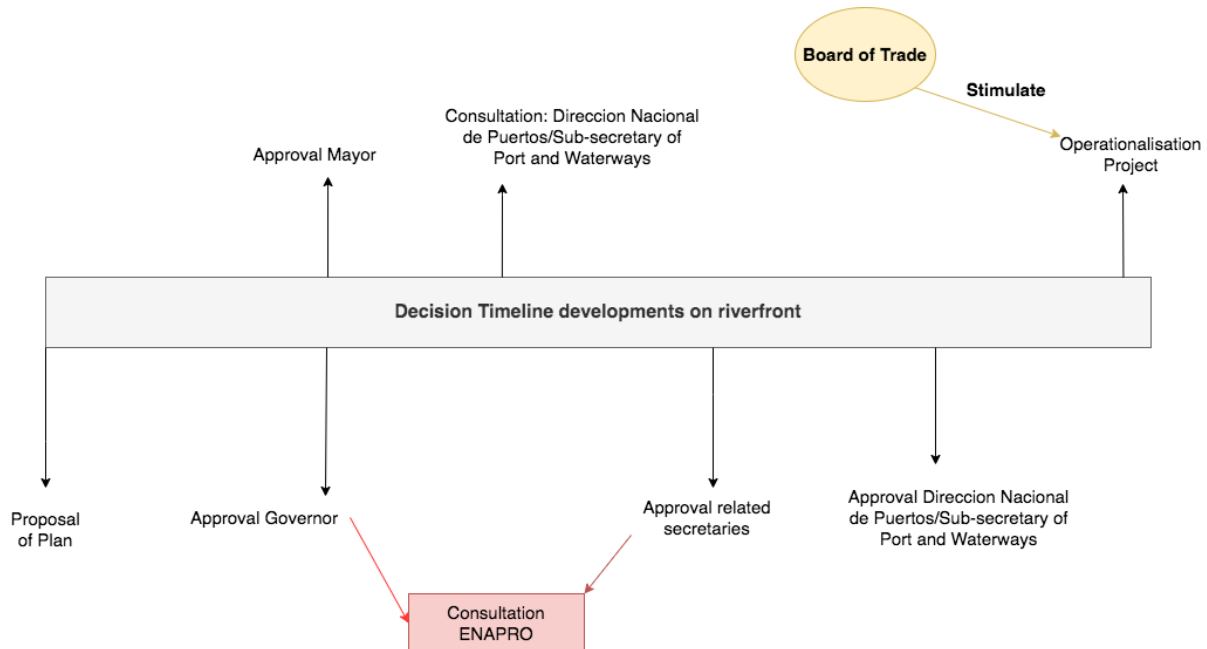


Figure 6.3: Decision Time Line

Power-interest analysis

A power-interest grid is a method that is used to understand the current situation of the riverside. Ackermann and Eden discusses the potential use of a power-interest grid for the management of teams within an organisation. They discuss a traditional grid with 4 quadrants, each representing a different category of stakeholder. The axis represents the level of interest and power a stakeholder can have. The power can be used to sabotage the new plan or support it, the most influential actors [65]. The traditional framework found by Ronald K. Mitchell and Wood (1997) shows the classic categories for stakeholders based on the power of influence of a stakeholder, the legitimacy of the relationship between stakeholder and the urgency for change from the stakeholders point of view. Olander (2006) adds to this theory that this framework can be enhanced and further developed into an impact index. He claims that the interest a stakeholder has can be translated into probability of an actor influencing the project. However, these frameworks are based on a stakeholders perspective usually from the initial point of view. The static framework shows how stakeholders can influence from the beginning on, but does not show how interest can possibly change during the period of a project and therefore also its impact on it. Thus, this type of static framework has limitations for the engagement strategy because it does not adapt to stakeholder dynamics.

Stakeholder Dynamics

As a static stakeholder analysis can only provide the perspectives of stakeholders at one single point in the development. A more dynamic framework is used to include stakeholder dynamics in the analysis. Missonier and Loufrani-Fedida (2014) indicate that there is a need for a dynamic framework to show the relationships and perspectives of stakeholders over time. Actor-Network theory was used as a basis to develop an approach for a more dynamic framework that includes the interest of a stakeholder and the project goals simultaneously changing over time. Actor-Network Analysis provides insight on

the possible future interactions between different stakeholders and the related project. Missonier and Loufrani-Fedida propose a more dynamic framework in two steps. First, looking at the stakeholder network and stating the level of union and interaction between the different stakeholders. The second step, will conceptualise and include the network changing over time [68]. As seen in above, stakeholder theory holds various types of concepts and frameworks for identifying, classifying, and categorising stakeholders to understand stakeholders motivations and behaviours in order to manage them. Aaltonen et al. also discusses the dynamics of stakeholders in a project over time with the stakeholder salience-position framework proposed by Ronald K. Mitchell and Wood which explains how managers regard stakeholders in their decision making in the front-end of a project and how stakeholders positions and influences may change. For further analysis of stakeholder dynamics of the riverfront of Rosario, a position-salience analysis is conducted as it incorporates all important factors dynamically for a redevelopment plan.

The front-end of the project is considered the phase that covers all the activities from the project's idea generation to the more detailed planning phase. The phase in which stakeholders' positions are shaped and the stakeholders' potential to influence the project management's decision-making process is the highest. Since stakeholders have their own objectives, interests, and expectations that may conflict and cause challenges to project management, it is important to understand these differences in the front-end of the project in order to strategically manage them to ensure project success.

Salience refers to the degree to which managers give priority to competing stakeholder claims. The priority of the managers is determined by the framework by classifying stakeholders according to the salience attributes, namely, power, legitimacy, and urgency of their claims described below based on the stakeholders' different objectives, interests, and expectations [17].

- *Power* is exercised through the provision or withholding of material, financial, symbolic, or physical resources;
- *legitimacy* is defined as a “a generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions” and;
- *urgency* is defined as “the degree to which stakeholder claims call for immediate attention.” It is based on two attributes: (1) time sensitivity—the degree to which managerial delay in attending to the claim or relationship is unacceptable to the stakeholder—and (2) criticality—the importance of the claim to the stakeholder [66].

Stakeholders' attributes and their position on the project do not remain steady-state during the project, but have a dynamic nature due to changing objectives, interests, and expectations during a project, and consequently their power, legitimacy, and urgency of their claims change as well. Research by Aaltonen et al. clarifies that the stakeholder dynamics can be determined by remodelling the objectives, interests, and expectations as well as power, legitimacy, and urgency of their claims throughout the project, which eventually shows the changes in the degree of stakeholders' salience attributes and in stakeholders' stance toward the project (i.e., the degree of supportiveness toward the project). Such dynamics may be influenced by changing stakeholder influence and management strategies in order for them to get what they want or projects' contextual conditions such as institutionalised practices and the institutional environment that project may face, which all influence project's front-end stage and so influencing decision-making [17].

In Appendix A, each stakeholder's salience attributes and position is identified. The dynamics in the salience of the actors are shown in the figures below. The salience/position matrices are set in two phases. Figure 6.4 represents the salience/position matrix in phase 0 and Figure 6.5 shows phase 1. Phase 0 is based on secondary data and literature, composed before the implementation of the plan. Phase 1 is based on the implementation of the plan. The implementation of the plan was during the interviews with the relevant stakeholders. The interviews can be found in Appendix C.

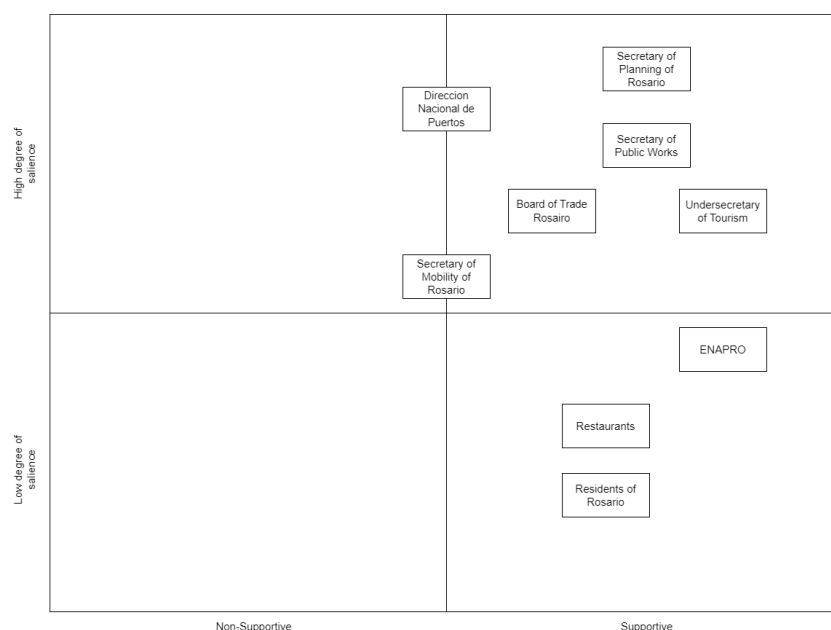


Figure 6.4: Saliency/position matrix, phase 0

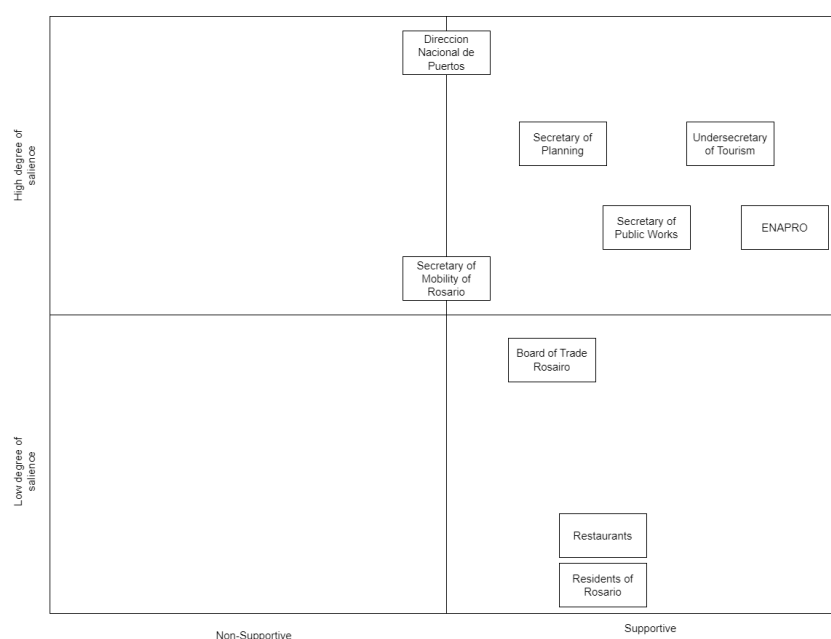


Figure 6.5: Saliency/position matrix, phase 1

The figures above that make the changes in the degrees in salience and supportiveness towards the project visible are based on the characterization of the stakeholders (Appendix A). The characterization discusses the salience attributes (power, legitimacy and urgency), degree of (non-)supportiveness and the stakeholder influence strategies. What caused the changes in the matrices is described next.

Based on publicly reported information on BCR it was expected of them to have a large influence on the project because of their decisive power; therefore a high salience. However, as turned out they are involved in the investment process as the connecting link between the private and public sector. Therefore, their level of salience is decreased. Furthermore, the commission on transportation and infrastructure has a different vision on the necessity of port-city integration projects than other commissions within BCR because that is not their main focus. The commission on transportation and

infrastructure indicated that they are aware of the importance of the relation between the port and the city and that this lack is an important issue. Because of this reason their supportiveness remains unchanged. Perhaps the commission that is related to port-city integration projects will have a different degree of supportiveness.

As the Undersecretary of Tourism promotes the local tourism of the city and the redevelopment of the riverfront would increase the tourism of the city. This degree did not change as they indicated that they indeed would see the added value of the redevelopment, but because this is their main objective they this would be just in line with their vision. If initiatives become more detailed they may become more supportive. Regarding their salience they increased because they do have already internal plan to re-use the old (port) structures for tourism (urgency) and they are working on restoring the economic and touristic position of the city again (legitimacy), however their power decreased as they do not initiate projects that relate to the waterway. Because it is not in their jurisdiction, but part of the Nation (power).

As the Secretary of Planning is focused on heritage preservation and sustainable development. They will be supportive of redeveloping the riverfront into a more port and city integrated area. Heritage preservation is a key theme of the port and city integration as the port of Rosario used to be larger and more visible. The port-city integration will create more awareness, thus a stimulant for heritage preservation. After implementation of the project, their degree of supportiveness stays supportive, however due to their past investigation into the initiative of the watertaxi/bus they concluded that solely implementing this initiative will not be supported because of the negative business case. It turns out that the Secretary of Planning is partly dependent on the National State Government, because the Government still owns land in the municipality of Rosario. The plans have to fit into their vision and the Secretary has to show what the result will be on the public spaces. This is the reason for a change in their salience position in the matrix.

ENAPRO's responsibility relate to the coordination and management of all port related activities, integrate the port and city, and optimise communication between public and private actors. The internal technical knowledge of the organization, which is scarce among the governmental organizations in Rosario can be used for the initiatives of the redevelopment plan. This scarce resource will increase the salience. Furthermore, their willingness for participation in the project increases their degree of supportiveness.

Municipal documents indicate that participation and involvement of residents and business owners is an important topic in order to redevelop the city for the future. The Secretary of Planning however indicated that there is no involvement and influence from those actors, because they are not taken into account during projects. This will lower the salience of these two actors. No interviews are held with representatives of these actors, therefore dynamics are only caused by information from other actors.

The actors Secretary of Mobility and Direccion Nacional de Puertos remained unchanged because their interviews were cancelled. Direccion Nacional de Puertos their salience increased due to input from other interviews.

6.1.4. SWOT analysis

The interviews with the stakeholders revealed information related to their concerns about the project/initiatives, roles (now and in the future) and visions. Using a SWOT analysis, this information is translated into the strengths, weaknesses, opportunities and threats of the process. An overview of these factors is shown in Figure 6.6. As explained in Chapter 3.4, the four different factors are combined to use the strengths to take advantages of the opportunities and overcome the threats, using the opportunities to overcome the weaknesses, and manage the weaknesses to make the threats less severe. These combinations are input for the engagement strategy as it creates links between the actors in order to improve the process. This strategy is discussed in the next section.

	Internal	External
Helpful	<i>Strengths</i> - National University of Rosario is involved by the municipality in the investigation on the collapsed riverfront - Secretaries of municipality do have mandate on small, and non-waterway related projects - Secretary of tourism has plans to increase port awareness by combining education for children and the National University of Rosario with tourism - ENAPRO owns the port area - ENAPRO has ports and waterway engineering knowledge - ENAPRO wants more cooperation and participation with the municipality and in projects - ENAPRO is working on strategic plan to improve internal structure	<i>Opportunities</i> - Port awareness to 'solve problems' by more formal and informal education - Creating solution space for old port structures (in the water) - Connecting other side of the river with the city (already a project of Planning) - Involvement of Board of Trade for financing - Including the National University of Rosario in researching the ports and waterways for ENAPRO - Creating an overarching collaboration for redevelopment - Using ENAPRO's ports and waterway engineering knowledge for redevelopment
Harmful	<i>Weaknesses</i> - Too little formal and informal education & lack of awareness and interaction between city and port - Secretaries of municipality do not have mandate on large, and waterway projects and need to include National State Government for approval - Port and waterway knowledge is missing at the municipality. Need for involvement of consultancy bureau - No information available on current state of old port structures in the river - Secretary of Planning is not planning giving the old (port) structures a new function - Using water taxi solely for transporting people along the riverfront is not profitable (Secretary of planning) - Municipality has little budget for redevelopment and needs governmental funding - ENAPRO's internal structure (political organization + changing every somewhat 4 years) hampers initiating projects - ENAPRO does not have enough resources (manpower) to conduct necessary research, support the municipality or participate in projects - No communication between ENAPRO and civil engineers of the Municipality	<i>Threats</i> - Scarcity of land - No change in formal and informal education - Political change in National State Government (every 4 years) influences feasibility - Stronger river fluctuations than expected that makes docs unuseable - No involvement of and collaboration with ENAPRO in port related projects of the government - Projects on port area and in waterways depend on approval of Authority of Waterways

Figure 6.6: SWOT-analysis based on stakeholder interviews

6.2. Engagement strategy

Now that the current situation of the stakeholders is known in terms of what their views are on the decision framework and where they are located on the salience-position matrix, the engagement strategy can be formulated. The goal of the strategy is to engage the stakeholders for the project (i.e. getting all actors in the same direction in the process) through communication, negotiation, compromising and working on relationships [69].

From the combinations of the four factors of the SWOT analysis and the salience/position matrices, in total five main strategy topics can be distinguished: lack of resources, formal and informal education, internal knowledge on ports and waterways, creating an overarching entity, and availability of land.

6.2.1. Lack of resources

Multiple actors lack different types of resources. By connecting different actors and/or including actors in the process, these deficits can be overcome. First, ENAPRO indicates that they want more cooperation and participation with the municipality in projects related to the port. However, they have a lack of human resources to conduct their own research and participate in projects. The existing involvement of UNR in the research into the riverfront initiated by the municipality can be extended. UNR can work together with ENAPRO whilst they do not have enough resources for conducting their own research and for participation in port related projects. Second, the municipality experiences a lack of financial resources and indicated that implementing the water boat/taxi is an expensive initiative. By involving the Board of Trade in the process funding can be obtained. The project has to fit their interest. According to the stakeholder analysis, BCR is concerned in projects that involve contributing to economic development of the region and are linked to economic, social, educational and cultural development of society.

6.2.2. Formal and informal education

The municipality of Rosario, ENAPRO and BCR all indicate that there is a lack of port awareness in the city. The reason for this is most likely a lack of (in)formal education. The strategy to overcome this lack of education is to engage UNR. The involvement is twofold. On the one hand, *informal* education can be enhanced by students that work with ENAPRO. They will spread information about the port amongst the citizens of the city. On the other hand, the *formal* education about port and waterways will increase within both UNR and ENAPRO because of the research that will be conducted. This is the driver why UNR wants to be involved: the increase in knowledge and therefore the level of education.

6.2.3. Internal knowledge on ports and waterways

The responsibility of the municipality for maintaining and redeveloping the waterfront of Rosario is hampered by the internal missing knowledge on ports and waterway. Currently they consult consultancy firms to perform research or write technical reports. The available knowledge on ports and waterways

that ENAPRO has, assisted by the involvement of UNR, can be used to overcome the lack of knowledge. Another advantage of involving ENAPRO is the increase in data about old port structures (in the water) which could create solution spaces for the old structures. This eliminates the need of the municipality to reach out to consultancy bureaus for the knowledge on ports and waterways.

6.2.4. Creating an overarching entity

The internal organizational structure of ENAPRO used to be focused on the managing the administrative side of the port and not on initiating and monitoring/controlling port projects. Decisions were mainly politically driven. Due to a change in presidency this started a change in vision which is currently more focused on initiating projects and control for ENAPRO. However, future changes in presidency and therefore visions are not unlikely and therefore this can influence feasibility and commitment of/ and in this process.

The National State Government of Argentina is involved in initiating projects, bot spatially and related to the river. Within the Government, systematic changes in visions occur almost every four years. Again, these changes will most probably influence feasibility and commitment of/ and in this process.

Because this riverfront redevelopment will be long (exceeding a political cycle), dynamics in political visions and therefore interests into the process will be likely. In order for this process to be more independent from these changes, an overarching entity is advised. This entity should be a collaboration between ENAPRO, the municipality and UNR. This entity improves the current lack of communication between ENAPRO (province of Santa Fe) and the municipality of Rosario. An important aspect for this entity, especially due to the changing internal organization in ENAPRO and the National State Government is to establish commitment based on common interest and shared values [17, 14, 16, 15].

6.2.5. Availability of land

There are many old port related structures along the riverfront. Most are located on land that is owned by the municipality and do already have a function, as shown in the function map (Appendix ??). To facilitate initiatives such as the port museum or the water bus/taxi there is a need for space. The municipality can engage with ENAPRO because they own NTF and it has overcapacity. ENAPRO indicated during the interview that the NTF building can facilitate the port museum and serve as a main embarking location for the water boat/taxi. Furthermore, Parque Urquiza, also currently owned by ENAPRO could also facilitate as hub location. Combining land-uses (port-city integration) will reduce the scarcity of land.

While using the proposed strategy one has to be aware of the dynamics that the involved actors have. Within the municipality the different Secretaries experienced dynamics compared to the expected dynamics from phase 0. The Secretary of Planning decreased in the degrees of salience and supportiveness. This means that a policy should be developed to prevent them from blocking the process. This can be done by lowering their concern about the water taxi/boat having a negative business case. This will prevent that their degree of supportiveness will decrease further.

On the other hand, the Undersecretary of Tourism gained in their degree of salience. Especially their increase in legitimacy and urgency can create awareness within the municipality to initiate the process. Together with the Undersecretary of Tourism, ENAPRO can be used to create more drive to get the process going because of their increase in in salience and supportiveness. Within the overarching entity ENAPRO can be the initiator of initiatives and continuous cooperation. Their importance is due to their internal technical knowledge which is a scary resource in the process and their ownership of land.

The Direccion Nacional de Puertos gained in their degree of salience, more specifically in terms of power. It is of great importance that their degree of supportiveness does not become negative. Therefore they should be involved as early as possible in the process to increase their degree of supportiveness.

6.2.6. Collaboration model

The recommended collaboration model is shown in Figure 6.7. In order to realise the redevelopment, ENAPRO and the municipality need to collaborate and implement these initiatives together to ensure more participation from both parties. The province and Nation will consult the each party as they will need to be accountable for their plans. As there is a high demand for technical knowledge, the University of Rosario is placed in the collaboration model. This will increase the awareness for the students and will add technical knowledge to the current and future civil engineering plans. The sub-secretary of port and waterways or the Direccion Nacional de Puertos will give their final permission for the initiatives that are connected to the waterways.

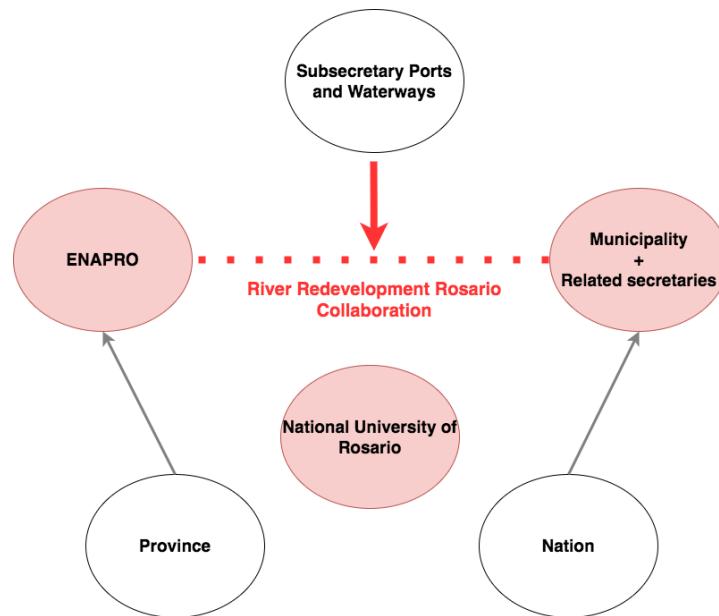


Figure 6.7: Collaboration model

Conclusions and Recommendations

The spatial plan that is proposed in this report redevelops the riverfront of Rosario from a disconnected area between the port and city and insufficiently maintained transition zone between the city and river into a more safe and accessible place that connects the city and port in a sustainable and innovative way. The plan also stimulates port-city integration as there is a lack of awareness of the significance of the port at the moment. The vision of the plan falls within and strengthens the current strategical plan and vision of the municipality of Rosario, La Vision Rosario 2030, in order for the riverfront to reach its full potential.

This project analyses the current state and the problems found along the riverfront and finally recommends six new initiatives to enhance port-city integration. The implementation of water hubs is proposed together with the reuse of stranded boats and port elements, a port museum, tourist information boards, water taxis or -buses and the restoration of the riverbanks. It is suggested to use riprap as a riverbank protection and for the water hubs, the existing structures in the water can be utilized as their capacity is sufficient. The current stakeholder problems, namely a lack of resources, formal and informal education, internal knowledge on ports and waterways and availability of land are hampering the potential redevelopment. These problems will be addressed by the stakeholder engagement strategy in order to engage the stakeholders for the project through communication, negotiation, compromising and working on relationship. An overarching entity should be a collaboration between ENAPRO, the municipality of Rosario and the National University of Rosario to become independent from dynamics in political visions and create common interests and a shared vision. The decision framework that is recommended creates space for ENAPRO to act as a consultant in the general decision making process; the sub-secretary of ports and waterways or the Direccion Nacional de Puertos should be engaged in the beginning of the decision-making; and the Board of Trade is placed as a stimulating actor.

As follow up of the spatial plan, it is recommended to do further investigation. Due to the limited time span in which the plan is composed, it could not be worked out in detailed. For this reason it is recommended to perform a cost analysis of the total plan. This analysis will show per initiative the finance it requires and who will be responsible for them.

In the future it is important to involve more disciplines and actors to exchange information and knowledge. Including actors such as: residents, businesses along the waterfront, cultural and educational organizations, architectures, etc. This step should be conducted early on in the project when a more extensive spatial plan is created.

The first initiative "Reuse stranded boats and port elements" needs further research. The costs of relocating the stranded boats along the riverfront has to be studied as well as who is responsible. This is because the stranded boats are located in National waters but is in the interest of the Municipality. In addition, the possibility to replace the boats without heavy damages should also be investigated. The most suitable locations for the port attributes are not selected in the current plan. To increase the impact of the initiative, it is recommended to do so.

At Nueva Terminal Fluvial, there are already a few tourist information boards located. However, a few boards are destroyed. In order to make the upcoming tourist information work, it is advised to design the boards in such way, that the information is vandalism proof. The future tourist information boards should extend the current information. How this could be done and what information the boards should contain, has to be executed in further developments of the project.

The port museum promotes awareness among the citizens of Rosario and will be located at the old port terminal Nueva Terminal Fluvial. The riverfront at Nueva Terminal Fluvial shows some sinkholes, and before the boats can moor at the quay wall it is highly recommended to perform an analysis on restoration possibilities of the quay walls. The museum content should address the information to a widespread population, therefore further research is necessary about finding how the content should be appointed to the certain age groups. The museum will generate cash inflow for ENAPRO, however, the museum must not overshoot its target with too expensive entrance fees. Consequently, it is advisable to lower the entrance fee in order to increase the accessibility to the museum.

The water taxi-bus concept will increase the accessibility to the river and will provide an informative navigation tour and (recreational) transport along the river. In the current plan the financial background has not been taken into consideration. For the initiative to succeed, a financial feasibility study of the water taxi-busses will be necessary. At this moment, the plan proposes four embarking points for water taxis in the scope. If proven successfully, a number of other embarking points are pointed out outside of the current scope. In order to determine if these locations are fit for a water taxi, a population flow study is recommended in future research. This will also help determine new locations for water taxi which can be added to the current plan.

The water hub contains floating bars, restaurants and docks where the water taxi-bus and private boats can moor. Because it contains multiple purposes, it covers quite a large area in the river. However, not every location is suitable to place the water hub. For this reason, it is suggested to analyse these locations more thoroughly in regards of technical feasibility. Additionally, a study has to be performed on the need of more restaurants along the waterfront and whether there is enough interest. The spatial plan does not contain environmental analyses on the proposed initiatives. Further elaboration of the plan has to include such analyses to create knowledge on the environmental impact of the proposed initiatives.

The multi-criteria analysis conducted in this report, made use of values collected from Dutch databases as it was difficult to retrieve information from Argentinian databases on this subject. For this reason, there is a possibility that the optimal design given in this report changes based on extra costs as a result of the need for more materials and labour of other unforeseen circumstances. If so, the values used in the analysis can change resulting in a different optimal design. Therefore, a more specific study of the costs of the three proposed alternatives are recommended. Additionally, some locations along the riverbank require more investigation on the feasibility of riprap as they often can be more complex than the chosen locations in the scope of this redevelopment plan.

To make a more specific riprap design, more research needs to be conducted. Data of the mentioned parameters should be collected and all different aspects per location should be taken into account. There is a need for the use of more calculation methods to provide a more extensive analysis on the rock sizes of the protection.

For the further expansion of the spatial plan outside of the current scope, it is also advised to look more into detail on the capacity of the existing structures found along the riverfront. For example, the mapping of the soil around the locations of the water hubs by performing a cone penetration test. In addition, destructive or non-destructive investigation on the concrete structures should be executed before giving the dolphins new functions. To determine the capacity of the structures that are located in the riverfront, the European Eurocodes of NEN and the Dutch recommendations of the CUR are used. These codes are accepted by Dutch regulations. However, there is a possibility that codes differ from the ones that are used in Argentina. Therefore, a more thorough study into these differences and its influence is suggested.

The stakeholder engagement strategy proposed in this report, containing strategies and actions is broadly framed. It describes the actors that should engage with each other and who should be involved at what moment in time. However, the strategy should be worked out in more detail to ensure high quality collaboration. Examples of details that should be added are the types, frequency and content of communication. In this plan is recommended that ENAPRO and the municipality collaborate to execute the different initiatives as they will not be able to implement solely. Additionally, it is proposed to involve the National University of Rosario in the process. It is recommended in the future to involve them in the process in order to map them in terms of their degrees of salience and supportiveness and their vision on the process and contain civil engineering knowledge. The Board of Trade of Rosario is already involved in the process. However, as turned out from the interview, the visions from the different commissions are equal. In order to see what their real stance towards the project is it is recommended to involve the relevant commission in the future. Both the involvements of the UNR and BCR should be early on in the process.

The stances of the stakeholders towards the project are mapped dynamically in the indicated phases 0 and 1. Mapping the stakeholders in a dynamic way is because the salience attributes of the stakeholders and their position on the project do not remain steady-state during the project. The characterization of the stakeholders (Appendix A) should be extended and mapped in the matrices as shown in Figures 6.4 and 6.5 throughout the project.

In the future, when the overarching entity is formed it is important to set procedural agreements on how decisions are going to be made. The involved actors in the entity will have different ways of decision making and therefore creating a shared vision on how decision are made is important.

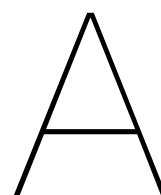
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Position salience analysis

Stakeholder	Position Toward the Project			Salience Description			Influence Stakeholder Management Strategy
	Primary goal	Degree of supportiveness	Degree of non-supportiveness	Power	Legitimacy	Urgency	
Secretary of Planning of Rosario	P0: Responsible for the urban development. Focus on heritage preservation and sustainable development P1: No change	P0: Focused on heritage preservation and sustainable development. Supportive stance towards port-city integration. Heritage preservation is a key theme of the port-city integration as the Port used to be a lot larger and more visible. The port-city integration will create more awareness, thus a stimulant for heritage preservation P1: Agree that the accessibility to the river needs to be increased and want to initiate projects	P0: - P1: Has investigated feasibility of watertaxi and other projects. Solely implementing watertaxi is not profitable. Lack of funding is a general problem	P0: High, main local authority that decides on projects that involve urban planning. Secretary can influence project impact and decides on making a go of it P1: Medium, still decides on municipal level the urban planning. However, they need permission and funding of the National State Government if projects exceed their mandate and if projects are on National grounds within the municipality of Rosario	P0: A governmental organisation that creates regulations for spatial planning and collaborates with higher ministries P1: No change	P0: Medium, as they oversee multiple projects in Rosario. However, the redevelopment of the riverfront is very much needed. P1: No change	They will deny the permit for the new spatial plan if they feel it does not collide with the current spatial plan. Unfavorable towards solely implementing the watertaxi/boat
Secretary of Public Works of Rosario	P0: To ensure quality of public works in the municipality of Rosario. Working on maintaining and initiating new projects in the public space P1: No change	P0: Supportive because the redevelopment will increase the overall quality of the city and in particular the riverfront P1: No change	P0: - P1: No change	P0: Secretary can influence project impact and decides on making a go of it P1: No change	P0: Legitimacy through status as an entity of the municipality of Rosario P1: No change	P0: Low urgency, will increase when appropriate parties are involved P1: Less, already technical knowledge through consulting consultancy bureaus for knowledge. Furthermore, collaboration with the National University of Rosario for researching the riverfront on collapses	Neutral position towards different sources of external knowledge

Stakeholder	Position Toward the Project			Salience Description			Influence Stakeholder Management Strategy
	Primary goal	Degree of supportiveness	Degree of non-supportiveness	Power	Legitimacy	Urgency	
Undersecretary of Tourism - Rosario Tourist Entity (ETUR) of Rosario	P0: Ensure and enhance value of city by increasing tourism P1: Promoting local tourism within the city. Providing offers to people that come to Rosario	P0: Redevelopment will increase tourism as more recreational activities will be possible and also the visibility of the importance of port will be visible P1: They do have internal plans to re-use the old (port) structures for tourism purposes	P0: - P1: No change	P0: Secretary can influence project impact and decides on making a go of it P1: Lower, as they do not initiate projects that relate to the waterway. Because it is not in their jurisdiction, but part of the Nation	P0: Legitimacy through status as an entity of the municipality of Rosario P1: Higher, because they are working on increasing the economic position of the city again after the COVID-19 pandemic. This decreased because conventions, that was an important touristic feature of the city, were no longer possible.	P0: Medium, as they may do not have knowledge of the potential value of redevelopment and the potential effect it can have on tourism P1: Higher, they do have internal plans to re-use the old (port) structures for tourism purposes	Positive position towards the re-use of old (port) structures
ENAPRO	P0: ENAPRO's primary goal is to create more efficiency within the port of Rosario P1: More control for ENAPRO. Trying to expand this part of the organization as it is the main port authority in Rosario. More cooperation, more participation in port related projects	P0: High, one of ENAPRO's main functions is to enhance city-port relations and restore the riverfront. Therefore, the redevelopment of the riverfront is a project they highly support. P1: No change	P0: Their degree of supportiveness relies on the objective of ENAPRO and the overarching organisations that influence ENAPRO their strategy P1: No change	P0: Medium. They are a governmental entity. That is part of the province of Santa Fe. However, they do not have any legal power to create regulation or vote in spatial planning outside of their grounds. P1: Low, they are trying to gain more power by re-organizing and expanding their technical department. However, more collaboration with other governmental organisations is needed.	P0: It is an entity within the province of Rosario, however their voice is not as loud as other governmental organisations. P1: Medium, ENAPRO doesn't have an active role in projects that they execute. Government only gives orders if they need ENAPRO, otherwise projects go without their notice. However, they do have internal technical knowledge which is a scary resource in the process	P0: High. As they stated that the redevelopment of the riverfront is one of their main themes. P1: High, because ENAPRO wants more cooperation and participation in projects	Showing the possibilities on their lands. Also, to control and execute the initiatives that are suggested in the plan. However, reliant on collaboration with the municipality to execute any plans.

Stakeholder	Primary goal	Position Toward the Project			Salience Description			Influence Stakeholder Management Strategy
		Degree of supportiveness	Degree of non-supportiveness	Power	Legitimacy	Urgency		
Board of Trade	P0: Concerned in projects that involve contributing to economic development of the region and are linked to economic, social, educational and cultural development of society P1: Involved in the process by representing the private sector in bringing the public and private sector together	P0: Expected to have a positive stance to the project as it contributes to their main goal P1: No main vision within the different commission of BCR. Supportiveness of the project remains unknown	P0: - P1: No main vision within the different commission of BCR. Supportiveness of the project remains unknown	P0: High, decisive actor in providing funding for projects P1: Low, intermediate in funding process between private and public parties	P0: Main actor in the fundings for projects in Rosario P1: No change	P0: Low, increases when project is initiated P1: Medium, aware of the lack of port awareness in the city and that this is a topic that needs improvement	Positive position towards increasing port awareness in the city Power to influence possibility to receive funding for project	
Direccion Nacional de Puertos	P0: To ensure high quality ports and waterways	P0: Supportive as long as it does not interfere with the operations on the waterways	P0: Supportive as long as it does not interfere with the operations on the waterways	P0: High: May cause interference by not approving the permit to construct and implement the redevelopment plan due to overarching spatial plan or interference with the waterway	P0: High: Legitimacy through status as the highest entity of the nation	P0: Low, this entity has no urgent need for more port-city integration and restoration of the riverfront as this does is not their function	-	
Secretary of Mobility of Rosario	P0: To ensure quality of urban mobility, ensure safety, improve the quality of life and reduce environmental impact	P0: As they state that they want to improve the quality of life for the citizens of Rosario, they would be more on the supportive side as this could bring more life and economics into the city. However, the redevelopment is not mainly focussed on improving urban mobility	P0: -	P0: Decides on projects that are related to urban infrastructure	P0: Legitimacy through status as an entity of the municipality of Rosario	P0: Low, this entity has no urgent need for more port-city integration and restoration of the riverfront as this does is not their function	-	
Restaurants	P0: Exploiting business along the riverfront	P0: Increasing riverfront value will most probably increase revenue	P0: Business could be inaccessible due to construction works or construction works can cause noisens	P0: Individually businesses have low power. When businesses along the waterfront join forces their power will increase	P0: Disturbing ongoing business operations can cause a reduction in revenue. Therefore concerns are legit	P0: Low urgency because the current status of the waterfront created the business as usual. In case of further decay of the waterfront it can harm business operations	Can have an impact through municipal elections	

Stakeholder	Position Toward the Project		Salience Description			Influence Stakeholder Management Strategy
	Degree of supportiveness	Degree of non-supportiveness	Power	Legitimacy	Urgency	
Residents of Rosario	P0: Benefit from the riverfront: use of public space	P0: Increasing riverfront value will most probably increase quality of life	P0: Municipal elections Nov-Dec 2023. Individually residents have low power. When residents join forces their power will increase	P0: Influence in municipal board and therefore their concern about the public space is legit	P0: Moderate. Improved public space improves life quality	Can have an impact through municipal elections Can form opposition groups to increase power



Map Redevelopment Rosario

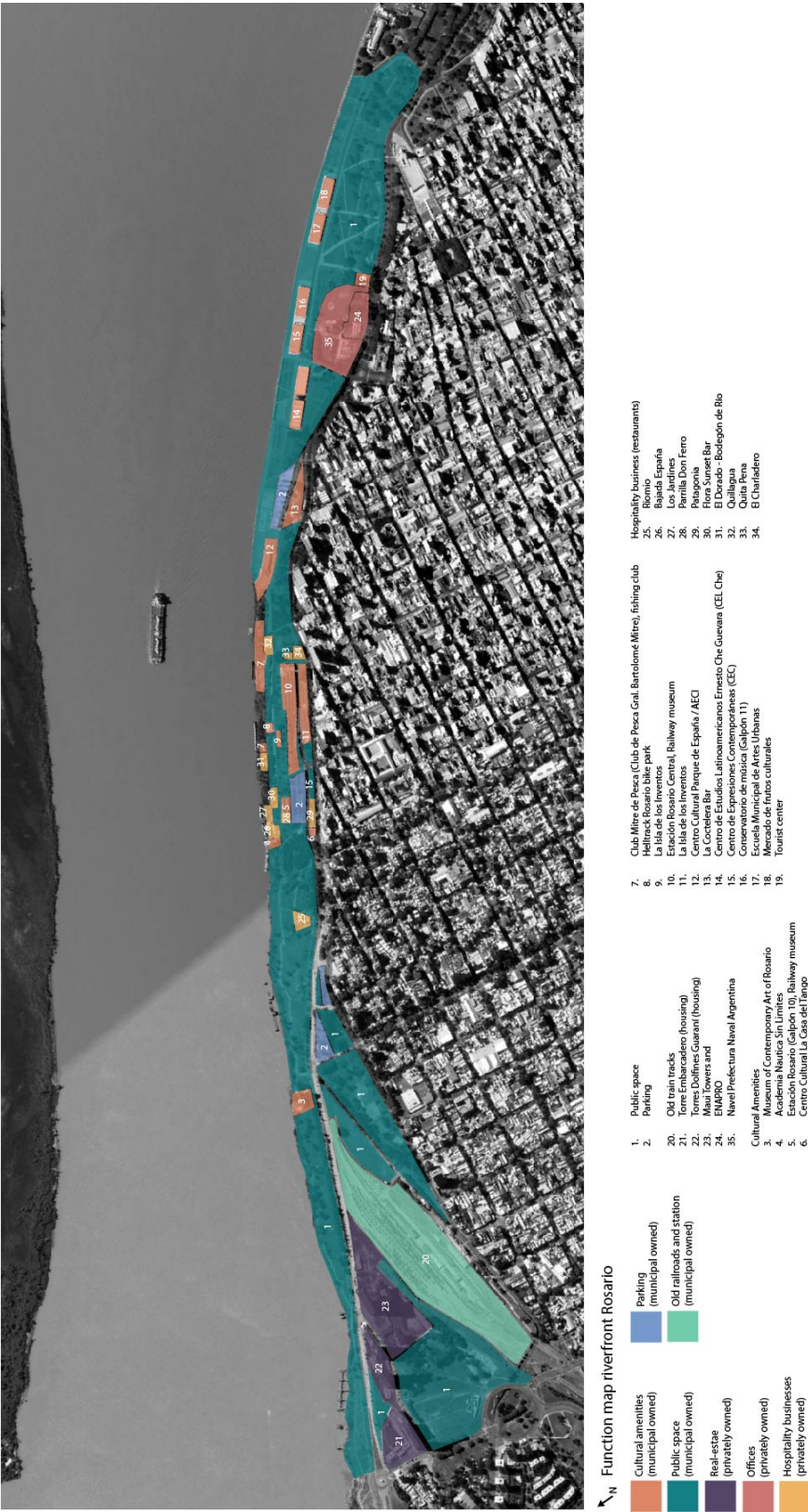
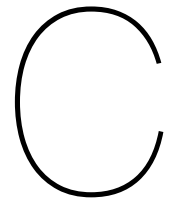


Figure B.1: Function map riverfront Rosario



Figure B.2: Proposed plan for the riverfront of Rosario



Interviews

C.1. Municipality - Secretary of Planning and Public Works

Attendees:

Secretary of Planning: Cecilia Martinez (C) (Subdirectora General de Proyectos Especiales), Agustina González (A) (Secretaria de Planeamiento), Victoria Alday (Coordinador/A Tecnico Obras Publicas)
MDP325: Daan Westerink, Thijn van Doormaal, Renske den Brave, Tom Kuster (all project members)

1. **What is the function of the Secretary of Planning within the municipality of Rosario, and how does it fit in the Redevelopment program?**

A: We work here in the urban planning secretary, that is in charge of the planning of the city. It has to mention that the port was located 15 years ago in the North part of the city. And because of the some urban planning policy it was decided to locate it in the South part. So the riverbank is very connected with the activities that took place in the North part.

Urban planning of the city is based on a solid plan, all interaction that the city takes on the river bank, has a connection with the different activities that take place in the whole city. So connection between North and centre, where tourism activities are and the South, where the port is located.

C: Hop-on hop-off boat initiative has mentioned several times, but that kind of transport is very expensive.

2. **What happened to the hop-on hop-off boat?**

C: It is only a boat that takes people to the other side of the river. Not to Buenos Aires or Sante Fe. But the river fluctuates too much, to use this kind of transport.

3. **Who owns the land?**

The land of the port is in private hands and operates private, so the land is not owned by the city.

All the land in the centre (Parque España for example) belonged many years ago by the national government. When the trains collapsed, the national government offered to give that land to the city, for public use only. So that is the reason that the city has all the collapsed parts of the riverfront.

4. **So when it first was owned by the government, the municipality did not need any technical knowledge to maintain it. But how is the level of technical knowledge now in the municipality?**

We have a very good engineering department, who are very concerned about the state of the riverbank. And we also work together with the University, to determine the collapsed quay walls. The municipality is very qualified in doing that kind of investigation.

5. Are you now busy with repairing the quay walls?

We have engineers who are looking at the coast, but for these projects we also have advice from consultants. With information from them, we asked for a fund of the national government for the repairing of the part in front of Parque España.

6. Are you also looking into the old structures?

These structures are only there to remind people of the port.

7. So for now you will not give these structures a new function?

No.

8. Is there a difference in visions between (redevelopment) projects in the past and present?

We are planning to remain some part that belong to the national government. It has to fit in the plan of the national government. We have to show our plans to the national government and show what the result will be on the public spaces.

9. Where are you now busy with? What kind of projects?

A: The area of the street left of the baquito (close to the railways), which is national government property, is very convenient. But since the government changes every 4 year it is hard to make decisions, because you have to start all over again and therefore it is hard to agree on something.

The national government makes decisions on what will built in a city. The city make suggestions and government will decide if it will be placed there.

10. Why is it structured like that?

C: Because of the property of the land.

A: If national government want to sell of develop that land, it depends on the price.

11. What parties of the national government are involved?

Argentinian association of national values/states.

12. Have business owners (bars/restaurants/hotel owners) expressed their interest in a redevelopment because they feel unsafe or the project could increase their property value/profits?

A: There are too many parties involved, so business owners have no influence on a redevelopment. They are the smallest party in the project, so if we want discuss something about the amount of are for a new project, these parties are not taken into account. We did ask the neighbours about what they want but that a different scale than the project itself.

13. Do all funds come from national government or is there also some money available in the municipality?

C: No not all funds come from the national government. It depends on the scale of the project.

14. If you are making plans for a redevelopment, at what level should a national government be involved in that?

C: If a land belongs to a city, the city has the authority to use the land as they want. We don't have the national government in that scale. We only have to ask permission if we have environmental problems.

15. What is your vision on water buses/taxis?

The engineers said that is not profitable, so we have thought about it. But they said it will not have influence on the traffic jam. We can manage to go everywhere around the city, the bicycle lines are good. So traffic is not a big problem.

16. Would it maybe be profitable for a private initiative to build a water taxi?

C: They came here with studies but they left because it also not profitable for them. Everything is very close to each other.

A: The difference with other cities in the world is that the river is used on two sides. Here we only have one side that interesting to go to. Maybe you could also contact: "coordination and entity"? they started that boat. I can give us the contact details.

Augustina is leaving.

17. What is your vision on the port city integration? Do you agree that there is a lack of awareness by the residence of Rosario.

The port is a private initiative so the connection between the citizen and the port is bad. Because it is not a public initiative, so no one can enter the port to see what happens there.

18. There are some solutions for the riverfront problems. But why aren't these solutions executed?

Because we don't have enough diagnoses about the coast, it suddenly collapsed, probably due to the fluctuations of the water.

We are concerned about them, but main reason: too expensive.

19. Which party is responsible for the maintenance of the collapsed walls?

V: The secretary of public works. We need to ask the national government, if they are in danger, we have to ask to the government if we can do something about it. We are working on an access to the river, because people are living on the other side of the river. So if they need for examples medicine they are coming to us.

20. Do you have information about the old structures in the water?

No they are too old.

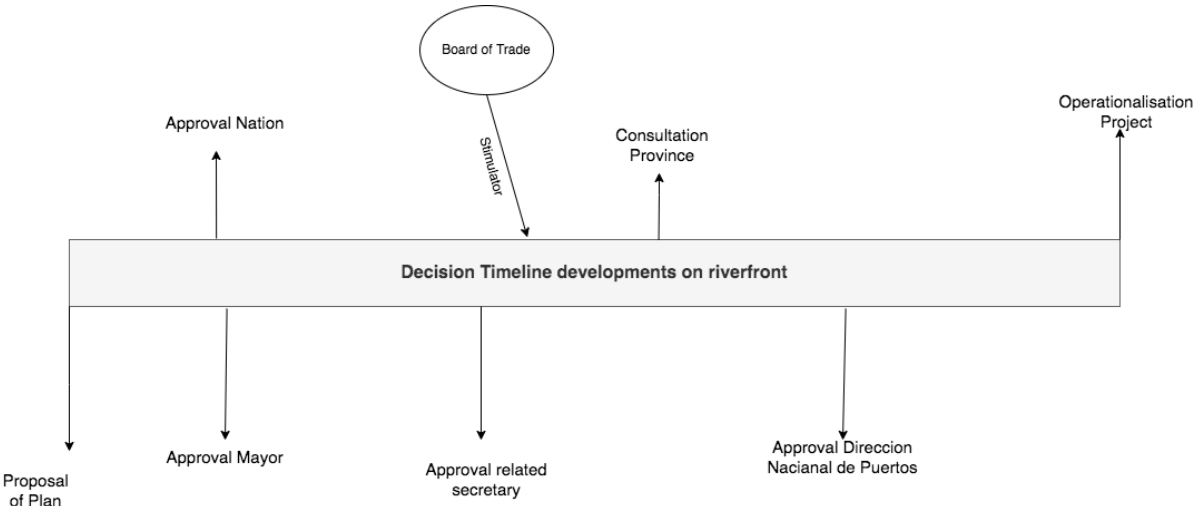


Figure C.1: Decision Timeline Planning and Public Works

C.2. Municipality - Undersecretary of Tourism

Attendees:

Undersecretary of Tourism: Alejandra Mattheus (A) (Undersecretary of Tourism)

ENAPRO: Julia Ortenga (civil engineer), Ricardo Terán (coordinator La Fluvial), Marcos Gambacorta (translator)

MDP325: Daan Westerink, Thijn van Doormaal, Renske den Brave, Tom Kuster, Cristel Veen, Danielle Termote (all project members)

1. How long do you work for the undersecretary of tourism in Rosario?

A: Two years in Rosario, however for over 20 years in the business.

2. What is the function of the Secretary of Tourism within the municipality of Rosario?

A: As part of local council and promoting local tourism within the city. Giving different offers to people that come to Rosario.

3. Are there recent projects within Rosario, related to the waterfront, that tourism is working on?

A: The waterfront of Rosario is not part of the city. The Rosario council cannot do anything with the waterfront because it is not in our jurisdiction so it is part of the Nation. The council cannot intervene in the waterfront, but we can register private parties that want to provide service in the waterfront; for example boat or ships in the rivers. The local department does not sell services, they work as a connection between tourists that come to Rosario and the private parties: connection between private and public.

4. What you explained does hold for the waterfront, does this also apply for the public spaces on top of the waterfront (e.g. the parks)?

A: Rosario is a really big city, a lot of different aspects where they do have projects on. She explained how the ownership of the riverfront changed over the years. Now they are focusing on showing it more to tourists. There are a lot of different functions along the riverfront (e.g. gastronomical, cultural, educational, etc.).

5. Are you implementing port projects at this moment in time?

A: It is hard to implement projects together with the port, because the jurisdictions are very different. That is why we are more focused on the tourism projects on the boardwalks and the islands in the river. From the 80's they are trying to change the type of services for tourists. The new services are serving more types of tourists. Example: the department is looking into multiple types of boats: boats that go onto the river for an hour or boats that go onto the river for multiple hours. This is serving tourists that stay in Rosario for one day or multiple days (respectively). The boats are working together.

MDP325: We have ideas that show more about port history to increase the awareness about the port. This could also be an important aspect for tourism. Its a very big port city, however this is not know, also not amongst the citizens.

Using old port artifacts to increase the awareness of the port is also a method to increase the port awareness and facilitates tourism. You want to make art of it or make walkways around it to attract citizens and tourists.

6. **You explained that for the waterfront you are depending on private parties to initiate the projects. For projects that are initiated by the undersecretary of Tourism, where does the funding come from? Is this a funding from the government or also from the private parties?**

A: The projects that she is working with are all governmental funded (not infrastructure). There is another entity within the tourism department and they work with private investors too, such as casino's, hotels, etc: hospitality business. It is necessary to also have private investors.

7. **Is the secretariat of tourism involved in the Port of Innovation project?**

A: No, tourism is not involved in this project because this project has not touristic function. It is initiated by a special fund.

8. **What is the reason that, even before the COVID-19 pandemic started, that Rosario was not a touristic city?**

A: Compared to cities in the rest of Argentina, Rosario does not have a sea, mountains or other nature. If people from Argentina would go on holiday they would rather go to places that have one of these aspects. Rosario is more popular for hosting big conferences and meetings; this is the main touristic feature. Rosario has a plan to increase the tourism now the COVID-19 measures are less strict. The municipality is first of all focusing on re-hosting the conferences and meetings as this was the case before the pandemic. Furthermore, they want to make Rosario suitable for going here for the weekend.

Increasing tourism and mixing it with education for children and the university of Rosario.

9. **What secretaries within the municipality of Rosario does the undersecretary of tourism work with during a project?**

A: During a project tourism works together with all relevant secretaries from the Municipality on a continuous basis. For example the secretary of Planning and the secretary of Public Works.

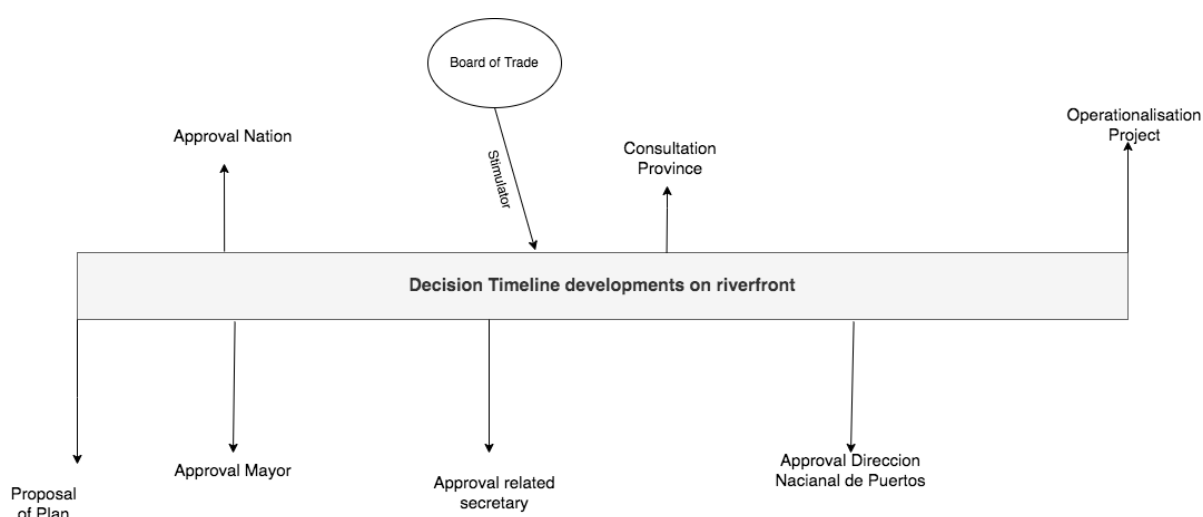


Figure C.2: Decision Timeline Secretary of Tourism

C.3. Bolsa de Commerce - Board of Trade

Attendees:

Bolsa de Commerce: Alfredo Sesé (A) (technical secretary of transportation and infrastructure), Pablo Marcelo Ybañez (P) (analyst of the commission of transportation, infrastructure and waterways), José E. Bernasconi (J) (coordinator of the commission of transportation, infrastructure and waterways)

ENAPRO: Matias Palma (civil engineer), Julia Ortega (civil engineer), Guillermo Miguel (president ENAPRO), Maximiliano Nielsen (Strategic communication consultant), Marianela Vinciguerra (secretary President)

MDP325: Daan Westerink, Thijn van Doormaal, Renske den Brave, Tom Kuster, Cristel Veen, Danielle Termote (all project members)

1. What is the main function of the Bolsa de Commerce for the city of Rosario?

A: Bolsa de Commerce de Rosario (BCR) is a non-profit organisation. BCR is involved in the investment process to improve the infrastructure and tries to collaborate with the development of the infrastructure and the economy. However, BCR is not involved in the actual investment. Exporters come to Rosario to buy soybean, grains and flower for their demand.

P: BCR represents the private sector to talk to the government and local governments. BCR is interested in the improvement of infrastructure.

J: Cost of transport is a very important signature for infrastructure. Nowadays a lot of cargo (85%) is transported by truck. BCR is interested in improving the railway infrastructure because this type of transport can lower the cost of transportation. This is an important issue that we want to improve.

P: Summarizing the main interests of BCR. First, improvement of the railway system because of what Jose mentioned before. The system is changing and now it is an important moment to determine the way we are going to use it for the next 20 or 30 years. Second, improvement of the waterway infrastructure and the administrative part of this system, e.g. the control of the regulatory body. Third, improvement of the highway system because of the large amount of cargo that is transported by truck. The highway is not in a good state.

2. Regarding the Port of Innovation in Rosario, this is one of the first projects that brings innovation into the city of Rosario. You are a partner in this project, however this project is not really related to the port and the waterway. What is therefore your role in this project?

A: BCR is a large institution. We are from the transportation commission, therefore our focus is not part of for example the project of the Port of Innovation. So, unfortunately, our vision is in that way more narrow and we do not know any details of this participation. On the other hand, we are aware of the importance of the relation between the port and the city and that an important issue is that this relation is missing.

3. Why and because of what reason do you think that the citizens of Rosario are not aware of the importance of the port for the city?

A: The port of Rosario was constructed many years ago. The port is the reason the city became as it is nowadays. The citizens of Rosario tend to think that the houses are older than the port and that they need to be put first instead of the port of Rosario. Another reason is the following. I studied Economics at the University of Rosario and there was no single lecture on the port of Rosario in five years. I think that it is important to introduce more formal and informal education about the port, infrastructure and the river. Formal by teaching in schools and informal by other means.

P: An example from the port of San Lorenzo explains the importance of awareness amongst citizens. At that port they experienced hindrance due to grain could when loading ships. Engineering solutions did not solve the problem. The solution was to teach students and provide excursions to the port. People started to learn about the port activities and this reduced the number of hindrance claims from the citizens.

MDP325: One of our ideas for the city of Rosario is to start a museum in La Fluvial. The main idea is to create more port awareness with this idea by re-using old port artefacts, etc. Inspiration comes from Furtureland in Rotterdam. This is used for school programs, citizens and tourists to learn about the port. In The Netherlands, it is common to go there when you are little. This is one of the ideas we are presenting to ENAPRO and the municipality of Rosario to create more port awareness and it provides the possibility for the port to grow and expand the number of functions.

A: Scarcity of land is one of the issues in Rosario. There is a trade-off: using land for port activities or other infrastructure. More port awareness can resolve this issue partially. We also have an issue related to people having the opportunity to have free access to the riverbank.

P: I agree with Guillermo that we do not show all the benefits of the port. 40/45% of the export of Argentina is grains, 80% is coming from the Rosario area. Citizens do not know the importance of the port. Personally, I had no idea of this importance until I started working at BCR.

4. Pablo, you started working here three years ago. Did you have any (technical) port knowledge or just no knowledge about the port of Rosario? Are there employees with technical knowledge of ports and waterways at BCR?

P: I studied civil engineering at the University of Rosario and I had no more than 5 classes about ports and waterways.

J: There are economists and port engineers at BCR. The organization is multidisciplinary.

P: There is also a commission that consists of employees from different sectors within transportation. For example, a civil engineer that worked 30 or 40 years before he came to BCR.

5. So, there is technical knowledge within BCR to solve technical problems?

A: Yes, the reason for our commission is that in certain points of the commercial chain you have a transportation issue. An example is that you produce and consume crops in different places. There are large volumes and little margins, therefore efficiency is fundamental. BCR, before the pandemic, we hosted visits from students. We showed them around the organization, teaching them about the history of the region and the port. Part of BCR's job is to show the importance of the port. We currently preparing to teach the local authorities about this relevance. Furthermore, in my own opinion, there is too little tourism in Rosario. We have some activities, but not enough.

6. We are looking, for example, into the wooden poles and the old dolphins. What is according to BCR the reason that these are not used and what is your vision about these structures?

A: Another international problem is the competition between the private and the private interest. Both actors want to have the most important point of the riverbank to use for themselves.

MDP 325: We look into the land of the municipality of Rosario and not the land of the private owners. We are proposing the idea of a waterbus/ water taxi to increase port-city integration. This bus/taxi would go from La Fluvial to different places along the riverfront. Old port structures (e.g. old dolphins) can be used as boat hubs. So, to come back here are points that you can

walk along the river but we are also looking at opportunities to go onto the river. We are here to discuss these ideas with you.

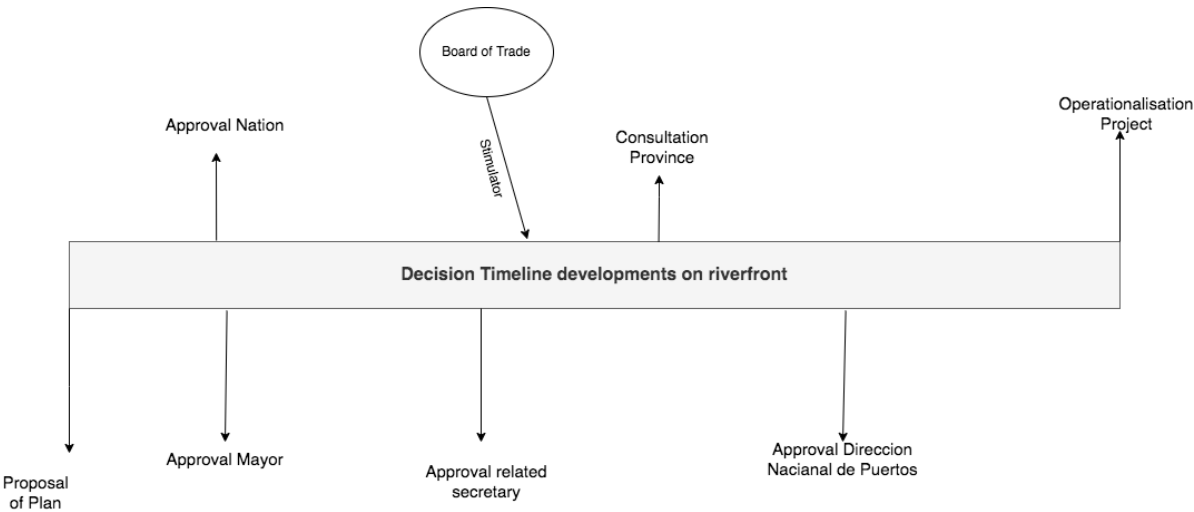


Figure C.3: Decision Timeline Board of Trade

C.4. ENAPRO - Matias Palma

Attendees:

ENAPRO: Matias Palma (civil engineer)

MDP325: Cristel Veen (project member)

1. What is your role within ENAPRO?

M: I am responsible for the planning of the Port of Rosario and its infrastructure.

2. And are there any technical projects running right now?

M: Concrete projects? No, not really at the moment. There are a lot of ideas that we want to do, but actual advanced plans are not executed yet.

3. In the past, have there been more technical projects?

M: In the past? Yes, there have been a couple of projects that required more technical knowledge? But these projects are a long time ago? Like these technical projects were more than 10 years ago.

4. Do you have an example of one of the previous projects executed by ENAPRO?

M: Yes, for example. The filling of 15/20 hectares to make a port terminal or a buffer zone.

5. The goal of that project was to expand the port?

M: Yes, exactly. 20 years ago, the NFT did not work. It was concessioned to other parties.

6. The NFT station has been there over 20 years?

M: No, longer. It has been there since the 1950's but during that time it was mostly closed. And in 1994, ENAPRO took over and it was concessioned. The building is really old, but we built an extra floor but the structure of the building is really old.

7. So as I understand, the NFT is owned by ENAPRO now and functions as an entry point for passengers to get on the boats that sail to the other side of the river? Has it always been that function?

M: No, until a year ago. It was concessioned to another owner, who was using it for a bar and restaurant. Also it could be rented for parties and such. But when Guillermo (the president of ENAPRO) started working at ENAPRO, he canceled the concession and changed the function of La Fluvial. In the future, he wants to use it solely for port activities. A bit like Futureland as you said.

8. Is that a decision that you ENAPRO can make by themselves or does it need to be discussed with the municipality?

M: Usually, we can decide it ourselves but it is important to consult with the municipality. But they have some of the same objectives.

9. So, I understand that the president of ENAPRO changes every four years. How long have you been working at ENAPRO?

M: I have been working here for 10 years.

10. Have the visions of ENAPRO changed?

M: There has been a change in presidency while I have been working at ENAPRO. Two years ago, the new president (now Guillermo) started with ENAPRO. The previous president had a very different vision for ENAPRO then Guillermo has now. The previous president worked at ENAPRO for 12 years, which is not very common. So the visions have been very different as they also have very different visions.

11. So what was the vision for ENAPRO and the Port in the past?

M: Well it was mainly focused on administration of the Port, not a lot of projects and activities, not a lot of control or monitoring of the port. We did not have a lot of control and disseminated it to others, not a lot of structure, it was a very political structure. Guillermo (the current president) has a very different vision. He wants a lot more control for ENAPRO. The current concessions need to be retaken again and ENAPRO should monitor and use their own lands. They have very different views, but the structure is the same. It can be hard to initiate projects.

12. And does the president of ENAPRO have some technical knowledge?

M: No, not really. Only me and Julia (supervisor of research) are experts in civil engineering at ENAPRO. There is a lot of demand for research for the port but there is not enough people to work on it. However, Guillermo and ENAPRO are trying to expand this part of the organization as it is the main port authority in Rosario.

13. So why has there not been a lot of collaboration with other government organizations?

M: I think, in my opinion. They know we exist, but we are small to them. We don't have that much power compared to them. So they feel like they should give us orders, but not work with us. ENAPRO does not have an active role in projects that they execute, they only give us orders if they really need us. However, we really want to have more participation in the projects they execute related to our ports.

14. So, the planning department and public works department of the municipality said that they have few engineers that help them with projects. However, they do not have any port engineers and always consult with external parties. Do you see the possibility of providing technical knowledge to them?

M: So they have engineers, but generally more for infrastructure and buildings not really for port engineering. So, I think we could provide and collaborate with them for sure. It makes sense. We have port engineers (or will be having) and they need to consult others on it.

15. Because right now the secretaries contract and consult external experts and the university to provide this knowledge, so do you agree that it could be a chance for ENAPRO to be this 'external knowledge provider'?

M: Yeah, it is not really normal. But I do not know. I think the same, it would be a good process. But right now, we still do not have a lot of civil engineers here either. But as I said one of our objectives is to grow that.

MDP325: So ENAPRO has a demand and a need to expand its technical department then?

M: Yes, but it is something that will transform the organization and that will take time. That is not something that can be done in one day. For example, The municipality and the province had projects that were located in the zone Port of Rosario, however ENAPRO was not participating in that project. ENAPRO just said okay and let them do what they wanted to do.

16. So the past president worked like that?

M: Well in the past, it was always very political. So now, we are trying to change that to a more technical organization that regulates all port activities.

17. So each president has its own goals for the organization which decides the direction of ENAPRO for a few years?

M: Yes, but there is never really structure. Now, we are working on it and we hired an external party to create a strategic plan to steer and transform ENAPRO into the Port Authority it should be and then the objective of the company can be different from the president but there will be some structure.

18. So is this the first project that ENAPRO has initiated to work on the riverfront?

M: Yes, I think this is the first time. Here in Rosario, each institution works a lot within the organization. So the area in front of ENAPRO is land from the municipality. But the land around it is from ENAPRO and we just do not work together. It's like this is your land and this is ours and that is it. The planning for the port does not work like that. We need to work together on it as these lands are so diversely owned. Also, there is no contact between ENAPRO and the 'technical engineers' at the municipality, therefore infrastructure and planning is very different.

19. In the Netherlands, we have people that will stay in the organization besides their political views who communicate projects and plans. Is it very different compared to ENAPRO?

M: Yeah, it is more political here. Also, the municipality is an organization that has more power, it has more money. ENAPRO is more of an institution that has some power but is also very political. So it could work.

20. So we have created this decision framework for projects with. Do you agree with how this decision framework looks or do you think it works differently? (Explains timeline)

M: In my opinion. The stakeholders are correct, but the order of the timeline is not. It is always a political decision first. So projects within ENAPRO will always first be discussed with the governor of the Province. He gives the first permission and then afterwards it will be a technical decision. So when it is a project from ENAPRO or the Province, the governor gives the first permission, then the mayor gives his permission. After, the secretaries like planning will discuss and give permission. The Board of Trade has no legal or actual influence in the decision making, they can stimulate the project but they do not have to get permission. They are more of an external actor.

21. And when it is a project that is not specifically initiated by ENAPRO, but by a private company or by the municipality. How does the order go then?

M: For example, the municipality can not initiate a project without the permission of the Mayor. The same for Guillermo (the president of ENAPRO), he cannot initiate a project without discussing it with the governor. So after it goes to the secretary of planning, after that to other secretaries and they all have to give their okay to the plan.

22. And it is possible that one of the secretaries says ‘No we don’t want to execute this project’?

M: Sometimes, it happens. It depends on the project. For example, in 2010 there was a project from the governor. It was called ‘port of music’, an amphitheater for concerts and cultural activities. They wanted to put it in a zone of the Port, like within the Port. Which was very difficult, but they really wanted to do that. The past president of ENAPRO was like ‘okay, you can do that’. After that, the municipality also said sure you can do that, because they both have the same political vision/goals. After that, the authority of the waterways said ‘no, you cannot do that, this is a port zone. We don’t want that’. So they created this whole project and it was already at a pretty advanced state and then the last organization said well no this is not happening. Then it just does not happen. They thought it was too technical for these parties to implement it in the port.

23. So ENAPRO could be in this framework to help them with technical plans for the port or related to the Port?

M: Yes, we would really want more cooperation, more participation. A way to collaborate more with the municipality instead of just receiving orders.

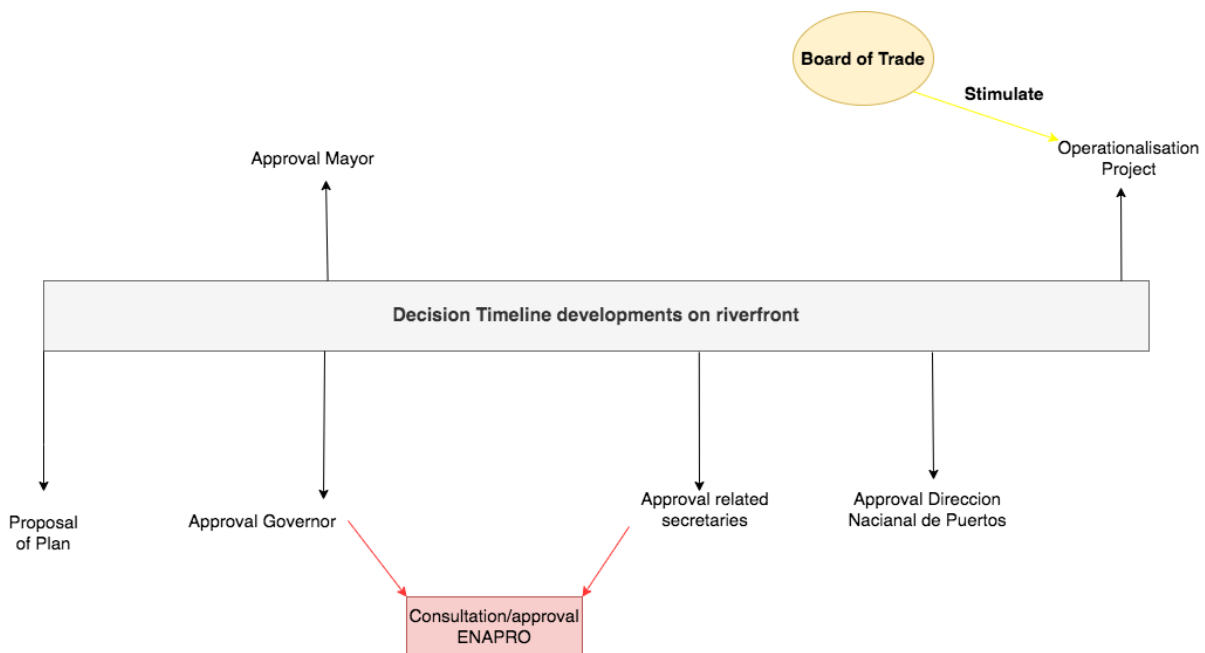


Figure C.4: Decision Timeline Matias Palma-ENAPRO

C.5. ENAPRO - Guillermo Miguel

Attendees:

ENAPRO: Guillermo Miguel (G) (president ENAPRO)

MDP325: Cristel Veen (project member)

1. What is your role within ENAPRO and your vision for ENAPRO?

G: My function: I am the representative for Santa Fe (the province) in the board of ENAPRO. ENAPRO is a non-state, public entity which has different representatives. So one for the Province, one for the Municipality and other executives that are from different entities that are related to port activities. Like the representative of grain, the representative of the cutter chambers, the representative of the chamber of import, of maritime and one more. The entity is related to the port activities concerning grain, oil and soy. Also, a representative of the maritime center who also works with those products. That is the physical composition of ENAPRO and I am the legal representative for the whole organization. But also, the decisions that we take are based on majority votes which are established in the bylaw of ENAPRO. I can give you a copy of the bylaw, so you can fully understand the structure of this organization. In addition, the vision I have. What do you mean by that? The port is a very broad term to me and there many things we need to do for it. I have a lot of visions for the port, commercial, tourism, environment, and education, all aspects that have a vision. But what do you specifically mean for a vision? There is also monitoring and administration but for here that is part of the vision.

2. Yes, I understand that ENAPRO does not have that much control at the moment. Like the last president did not interfere or tried to get involved with projects from the municipality even though they were in the port of Rosario.

G: In reality, it did not really interest them what ENAPRO used to do. For the city in general there is a vision that also includes the port and ENAPRO was not interested in what was going on in the port. We have two different criteria that are very different. I think there is a need for the integration between the port and the city which is different. Also, as the port, we need to have our own strategic plan. Because the city is always thinking for the city like a metropolitan; it's all people activities and without commerce, without port activity. The city wants to grow to occupy spaces and that is fine. Yes, so i have been thinking of doing something like Futureland. A little bit like Futureland but then in la fluvial.

3. Yes, we have been thinking of that too. It's one of the initiatives that we are thinking of, let me show you. We are thinking of making La fluvial the base point to start any recreational port activities. This is also because la Fluvial has enough space to start a museum and so next to the museum there would be an outside sort of port museum with old boats and a port history walk.

G: A little bit like in the aquarium? Like a walking tour through the museum?

4. Yes, but it wouldn't only be inside. There are many old port objects and structures in the water that show the existence of the old port. This walk would pass by those points and give information on them. They show the significance of the port back in the days, thus they think that it needs to be integrated more into tourism. So you have a port museum, workshops there and a port history walk all starting from la fluvial.

G: Yeah so i have a question. Hypothetically, you are foreigners and you do not work here. Down at la fluvial, you walk along this zone until puerto norte. A foreigner, do they see that this a port zone?

(MDP325): No not really.

G: Yeah so it is the same for ENAPRO but also the municipality does not know. All of it. the silos with the colors, they used for grain and now they are very obvious with all the colors. Yeah they made it really touristic. It is the same in Europe they use really little things and use them for tourism and things. And they do not do it for the port.

5. **Another idea that we have for ENAPRO, is a water bus that would start from la fluvial, because you already have embark docks and a functioning terminal.**

G: In the North, near Iguaza falls there is only one point that has a fluvial point. So a waterbus to connect more to the riverfront is really important.

6. **Yes, it is beneficial to the citizens of Rosario but also visitors as recreational mode. So we have four points that we are focusing on and the first one would be in Parque Colectividades. Therefore we also need to restore the riverbank and use old port infrastructure. So we are thinking of building a pier on the old dolphins and creating water hubs. After that it extended to other points along the riverfront, sometimes belonging to the municipality and sometimes to the province. This way ENAPRO would need to work with the municipality without losing control.**

G: So yeah, it sounds great. The only problem with the river is that level rises and lowers a lot so it is for sure important that the dock is floating. Also, it is nice to see that the plan forces collaboration. It is a little political everything, every project is hard to implement because of it.

7. **So we have made this decision framework and I would like to know what your take on it is. Who is the first person that decides if a project is taken on? (A project for ENAPRO)**

G: I think that ENAPRO has a vision for the development of the Port. I think that when we want to initiate a project, we need to tell the municipality that we are going to do this project and that they can work on it too. The problem is that there is no integration between the municipality and ENAPRO because everyone identifies ENAPRO with the province. Which is not fully correct because in the board there is a director of the municipality so it should be more integrated. We should understand the collaboration between the municipality, province and ENAPRO because there is a lot of empty space that can be used for the expansion of the port. Nowadays, the municipality just does projects and assumes that we will follow them. Also, we need to talk all the time with the municipality about what is better to do because I have different ideas for the empty zones along the riverfront in comparison to them. Like right now everything is really separated. You have the commercial port on one side and the city with recreational activities on the other side. I think that it needs to be more integrated. So ideas like the Futureland are great for that. A big problem is the different jurisdictions along the coast line. So when we want to do a project it usually has a different goal and they have. For us it is more important that the sub secretary of waterways approves and that we consult with them. Like right now, if there is a project past the Parque Espana even if it has to do with the waterways or the riverfront, ENAPRO is not consulted or told there will be a project.

8. **Yes, but indirectly the quay walls and the riverfront are related to the port of Rosario. So ENAPRO could be a consult or help with these projects right? It would also aid in more cooperation between the entities.**

G: Yes, we do not have any jurisdiction in projects beside our own, but we could for sure be a consultant to them. Here, the organization is really different than the organizational structure in the Netherlands. There are three important entities, the sub secretary of ports and waterways, the province and the municipality. ENAPRO has a different structure, it is a mixed structure. Because of the characteristics of ENAPRO, it is hard to communicate with other stakeholders because we do not have the authority. The state has to say that and not ENAPRO.

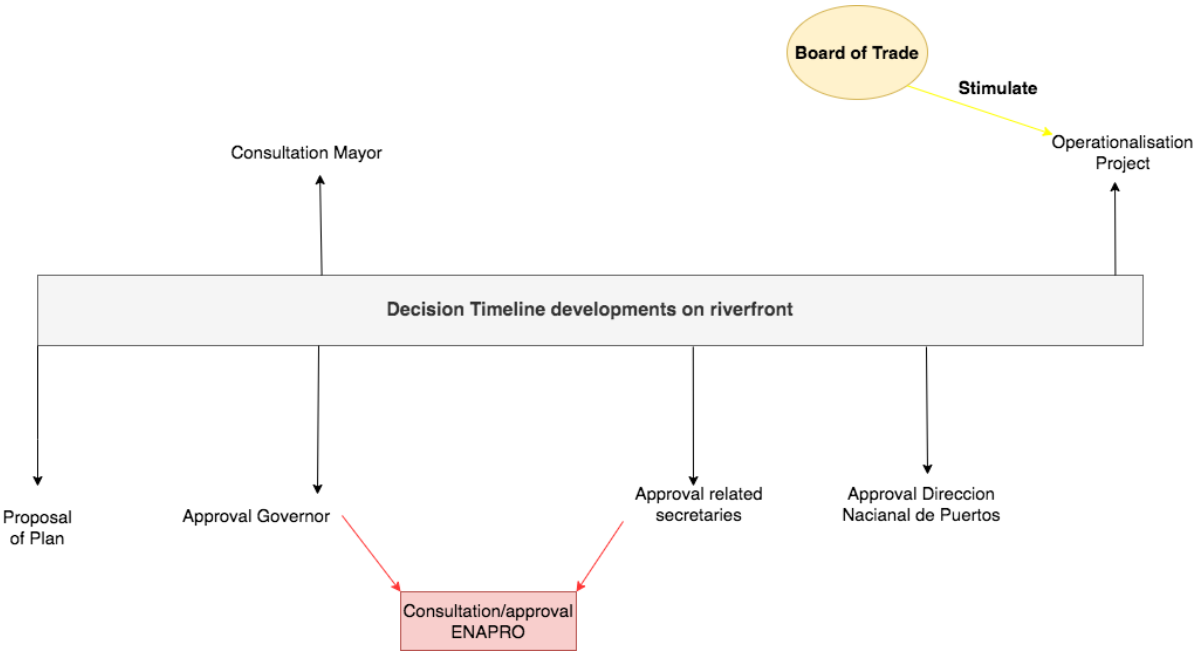


Figure C.5: Decision Timeline Guillermo Miguel-ENAPRO